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ABSTRACT

Seven papers address the teaching of self-management skills to disabled persons in supported employment settings. In "Competitive Employment: Teaching Mentally Retarded Employees to Maintain Their Work Behavior," (Frank Rusch and others), external cues managed by job coaches are contrasted to self-generated cues leading to employee self reliance. "Competitive Employment: Utilizing the Correspondence Training Paradigm to Enhance Productivity" (Katherine Crouch and others) demonstrates the effectiveness of verbal self-direction in improving the work performance of three retarded employees. "Teaching Task Sequencing via Verbal Mediatin" (Frank Rusch and others) reports procedures used to teach a moderately retarded woman to sequence her job-related tasks. In "Competitive Employment: Teaching Mentally Retarded Employees Self-Instructional Strategies," Rusch and others report on a self-instructional package utilizing a systematic question answering approach. "Teaching a Student with Severe Handicaps to Self-Instruct: A Brief Report" (Rusch and others) reports on the improvement of social skills through teaching proper requesting techniques. "Utilizing Self-Management Procedures To Teach Independent Performance" by Thomas Lagomarcino and Frank Rusch applies the procedures to a person with profound mental retardation. A conceptual framework for implementing self-management procedures in supported employment settings is presented in the last paper, "Utilizing Self-Management to Facilitate Independence on the Job" by Lagomarcino and others. (DB)

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Self-Management: Facilitating Employee Independence in Supported Employment Settings

Volume 4

Thomas R. Lagomarcino
Carolyn Hughes
Frank R. Rusch

EC 220510

TRANSITION
INSTITUTE
AT ILLINOIS

The following principles guide our research related to the education and employment of youth and adults with specialized education, training, employment, and adjustment needs.

- Individuals have a basic right to be educated and to work in the environment that least restricts their right to learn and interact with other students and persons who are not handicapped.
- Individuals with varied abilities, social backgrounds, aptitudes, and learning styles must have equal access and opportunity to engage in education and work, and life-long learning.
- Educational experiences must be planned, delivered, and evaluated based upon the unique abilities, social backgrounds, and learning styles of the individual.
- Agencies, organizations, and individuals from a broad array of disciplines and professional fields must effectively and systematically coordinate their efforts to meet individual education and employment needs.
- Individuals grow and mature throughout their lives requiring varying levels and types of educational and employment support.
- The capability of an individual to obtain and hold meaningful and productive employment is important to the individual's quality of life.
- Parents, advocates, and friends form a vitally important social network that is an instrumental aspect of education, transition to employment, and continuing employment.

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Self-Management: Facilitating Employee Independence in Supported Employment Settings

Volume 4

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and
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The Secondary Transition Intervention Effectiveness Institute
The University of Illinois at Urbana-Champaign

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Preface

Thanks to three separate developments, supported employment has begun to emerge as an exciting employment alternative for persons with severe handicaps. First, research projects and community services have demonstrated that most persons with severe handicaps are able and willing to work. Second, the results of deinstitutionalization and free, appropriate public education in the least restrictive environment have confirmed that many benefits can be attained by these persons through regular, daily contact with persons without handicaps. Third, recent efforts indicate the importance of ongoing support in helping persons with severe handicaps to remain in community settings.

Furthermore, recently enacted legislation that promotes employment opportunities could have a major impact on the independence and economic self-sufficiency of persons with severe handicaps. However, these efforts to promote employment will not be successful unless we meet the significant challenge to develop a technology that promotes the independence of employees with handicaps in community employment settings. Recent research efforts have been instrumental in the development and evaluation of a cognitive behavioral technology that teaches persons with handicaps to manage their own work behavior. The goals of self-management procedures are to involve the individuals in their own behavior change and to decrease the level of external supervision currently required if they are to remain in community employment settings.

In Self-Management: Facilitating Independence in Supported Employment Settings we have chosen to include several papers that address the importance of training in supported employment.

In "Competitive Employment: Teaching Mentally Retarded Employees to Maintain Their Work Behavior," Rusch, Martin, and White present two strategies for teaching employees with severe handicaps to maintain their work behavior. The first strategy incorporates cues produced and managed by job coaches. The second strategy focuses actively on the employee with severe handicaps in an attempt to teach that employee ultimately to rely upon himself or herself to manage his or her own behavior. It is the authors' contention that if job coaches are to be successful in facilitating the independence of employees with handicaps, they must focus on the development of self-management skills in supported employment settings.

In "Competitive Employment: Utilizing the Correspondence Training Paradigm to Enhance Productivity," Crouch, Rusch, and Karlan demonstrate the effectiveness of verbal self-direction in improving the work performance of three employees with mild to moderate mental retardation. In addition, this study provides practitioners with an excellent example of the use of subjective evaluation (supervisor evaluations) and social comparison (observations of nonhandicapped co-workers) in establishing criteria and evaluating worker performance.

In "Teaching Task Sequencing via Verbal Mediation," Rusch, Martin, Lagomarcino, and White utilized similar procedures to teach a woman with moderate mental retardation to sequence her job-related tasks. Specifically, the results indicated that when the employee learned to say the tasks in the sequence in which they were to be performed, she was able to peform the assigned tasks in the proper sequence. Interestingly, the employee demonstrated that she was capable of mediating her own work behavior by saying she was not going to complete targeted tasks on designated days. In so doing, the employee demonstrated that this procedure enabled a supervisor to assess the adaptability of the employee to alterations that occurred in her daily schedule.

In "Competitive Employment: Teaching Mentally Retarded Employees Self-Instructional Strategies," Rusch, Morgan, Martin, Riva, and Agran utilized a self-instructional package to improve the work perfomance of two workers with mental retardation who were employed in a large dormitory kitchen.

The employees were taught to (a) ask questions about which tasks needed to be completed, (b) answer their questions, and (c) guide their performance in the task by self-instructing. Additionally, the results of the intervention indicated that both employees spent more time working and met or exceeded nonprobationary, nonhandicapped co-workers' production standards.

In "Teaching a Student with Severe Handicaps to Self-Instruct: A Brief Report," Rusch, McKee, Chadsey-Rusch, and Renzaglia describe how self-instructional procedures similar to those reported in the previous study were used to improve the social skills of a student who was working in a community-based vocational training site. Specifically, the student was taught to request production supplies under two situations: when he ran out of supplies and when there were not enough supplies to complete a work order. The self-control procedure included self-instructional statements taught to the student during a preinstructional period. However, the student only made the self-instructional statements when systematic feedback was provided during the production period.

"Promoting Independent Performance through Self-Management Procedures" by Lagomarcino and Rusch is one of only a few studies in which researchers have attempted to teach self-management procedures to a person with profound mental retardation. The results indicate that in conjunction with a changing performance criterion, the self-management procedures increased the number of steps that the employee was able to perform without external supervision. The authors go on to point out that persons with multiple handicaps present some interesting challenges in the acquisition of self-management skills. Specifically, persons who exhibit tantrums, social withdrawal, and self-stimulatory behavior may require new methods of instruction in self-management.

In the last article, "Utilizing Self-Management to Facilitate Independence on the Job," Lagomarcino, Hughes, and Rusch provide a conceptual framework for implementing self-management procedures in supported employment settings.

We hope that this volume will provide insight into procedures that can be used by job coaches to increase the independence of target employees in supported employment. We welcome your comments and suggestions and hope that you find this document useful and informative.

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March 1988

Champaign, Illinois

Competitive Employment: Teaching Mentally Retarded Employees to Maintain Their Work Behavior

A very recent trend in the work behavior literature is the investigation of strategies for training mentally retarded employees in nonsheltered, competitive employment settings (Connis, 1979; Connis & Rusch, 1981; Cuvo, Leaf, & Borakove, 1978; Rusch, 1979; Rusch, 1983; Rusch, Connis, & Sowers, 1978; Schutz, Rusch, & Lamson, 1979; Sowers, Rusch, Connis, & Cummings, 1980; Wehman & Hill, 1982; Wehman, Hill, Goodall, Cleveland, Brooke, & Pentecost, 1982). These studies are distinct from previous work behavior studies in that the problem of maintenance, that is, the degree to which behavior endures once training is terminated, is of central concern. In early research, the issue of maintenance was largely neglected because it was presumed that the adaptive behavior change produced by interventions would be maintained by the natural environment (cf., Rusch & Schutz, 1981). However, despite isolated examples of spontaneous maintenance in the behavior modification literature generally (Bailey, Timbers, Phillips, & Wolf, 1971), and the work behavior literature

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specifically (i.e., Zimmerman, Stuckey, Garlick, & Miller, 1969), it is now widely recognized that maintenance does not occur automatically, but that procedures ensuring its operation must be built directly into the behavior change program (Baer, Wolf, & Risley, 1968; Kazdin & Bootzin, 1972; Kazdin & Polster, 1973; Marholin, Siegel, & Phillips, 1976; O'Leary & Drabman, 1971; Redd & Birnbrauer, 1969; Rusch & Schutz, 1981; Stokes & Baer, 1978).

Despite its obvious importance, the topic of maintenance has until recently received little attention in vocational habilitation. Yet, in order to facilitate movement of the mentally retarded person from sheltered employment to competitive employment, maintenance must be systematically explored. The purpose of this article is to review representative studies in the work behavior literature that help to identify parameters facilitating the maintenance of survival skills.

Research appearing to date suggests that mentally retarded adults are capable of acquiring specific, task-related skills and of improving their production performance (Bellamy, 1976; Bellamy, Horner, & Inman, 1979; Rusch, Schutz, & Heal, 1983). Although emphasis has been upon development and evaluation of training techniques, strategies that specifically relate to the durability or maintenance of behavior change have appeared in the applied mental retardation literature; these strategies are divided in this article into two subtypes: (a) those that incorporate externally produced cues, and (b) those that incorporate a combination of externally produced and self-produced cues. Because from a behavioral vantage point no behavior is seen as entirely self-controlled, self-control is instead viewed as under the control of a combination of externally and internally generated cues.

Recent competitive employment studies have used change agents who arrange antecedents or deliver consequences in order to change behavior. A few of these investigations have also assessed short-term maintenance through follow-up checks to suggest that target behaviors maintain once treatment is withdrawn. More recently, self-control strategies have been advanced as a means to facilitate maintenance.

Strategies Incorporating Externally Generated Cues

The majority of maintenance studies in the area of vocational habilitation have incorporated externally produced cues, whereby stimulus cues are regulated by change agents (e.g., trainers, co-workers, supervisors). These studies, while not addressing the topic of maintenance directly, have incorporated short periods of observation following training to assess whether behavioral changes endure. For example, Schutz, Jostes, Rusch, and Lamson (1980) incorporated contingent preinstruction with two moderately mentally retarded employees in helping them to acquire sweeping and mopping skills. Contingent preinstruction, consisting of verbal directions to correct an error, was administered by special educators whenever a completed task was judged unacceptable by work supervisors. Probes over a three-month follow-up period indicated that sweeping and mopping performance were maintained at acceptable levels. Throughout this follow-up period the same special educators who were responsible for providing contingent preinstruction continued to work with these employees. It is possible, therefore, that these employees maintained a level of acceptable performance while individuals who had been associated with providing evaluative feedback remained in the work area. Rusch et al. (1984) reported that employees do react, by working more, when observed by persons who are asociated with ongoing work performance evaluations.

Compliant work behavior of a moderately mentally retarded kitchen laborer employed in a nonsheltered vocational setting was increased and maintained in a study conducted by Rusch and Menchetti (1981). Before an externally imposed intervention the laborer responded inconsistently to co-workers' requests for assistance. After two practice sessions on how to respond appropriately to co-worker requests, and being suspended and sent home in one instance, the laborer complied appropriately to all subsequent co-worker requests. After day-by-day data collection, his performance level remained high during ten weeks of follow-up checks. The laborer in this study appeared to have associated potential dismissal with any co-worker with whom he failed to comply. Consequently, he remained under the control of co-workers associated with an aversive event (i.e., being fired).

Gold (1972) and Irvin and Bellamy (1977) examined retention of learned vocational skills by severely mentally retarded adults after intensive, externally controlled training programs in sheltered environments. Gold (1972) reported one-year retention of previously learned bicycle-brake assembly skills after redundant cues (color) were presented during skill acquisition and after previous acquisition to a rigorous criterion had been established. Irvin and Bellamy (1977) expanded upon Gold's (1972) study by examining retention of a bicycle axle/nut assembly task one year after initial acquisition training. This study reported high levels of retention without practice and without the use of redundant cues used during the original acquisition training, suggesting that these persons' behavior came under the control of the assembly task.

Several investigators have addressed the issue of withdrawing reinforcement and instructional cues, and bringing work behavior under the control of reinforcement schedules in the targeted, post-training environment (Crosson, 1969; Rusch et al., 1978). For example Rusch et al. (1978) taught a mildly mentally retarded woman to work continuously throughout a six-hour day in a restaurant setting. This investigation showed that a combination of praise and feedback (token points) for working, and response cost (loss of points) for not working, resulted in maximum work performance as compared to praise or praise and feedback without response cost. Data collected after the gradual withdrawal of the major training components indicated response gains were maintained. Figure 1 displays the results obtained by Rusch et al. (1978). These results indicate work performance maintained following the extension of the daily token-point exchange to weekly exchanges and, finally, to a weekly paycheck. Rusch et al. (1978) employed a sequential withdrawal design[1] whereby, once experimental control was established relative to the three combined treatment components, each component was withdrawn during a five-phase withdrawal sequence. This particular method of withdrawing externally generated cues allowed for the systematic management of aspects of training critical to the maintenance of behavior, and hence targeted

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[1] See Rusch and Kazdin (1981) for a discussion of withdrawal designs.

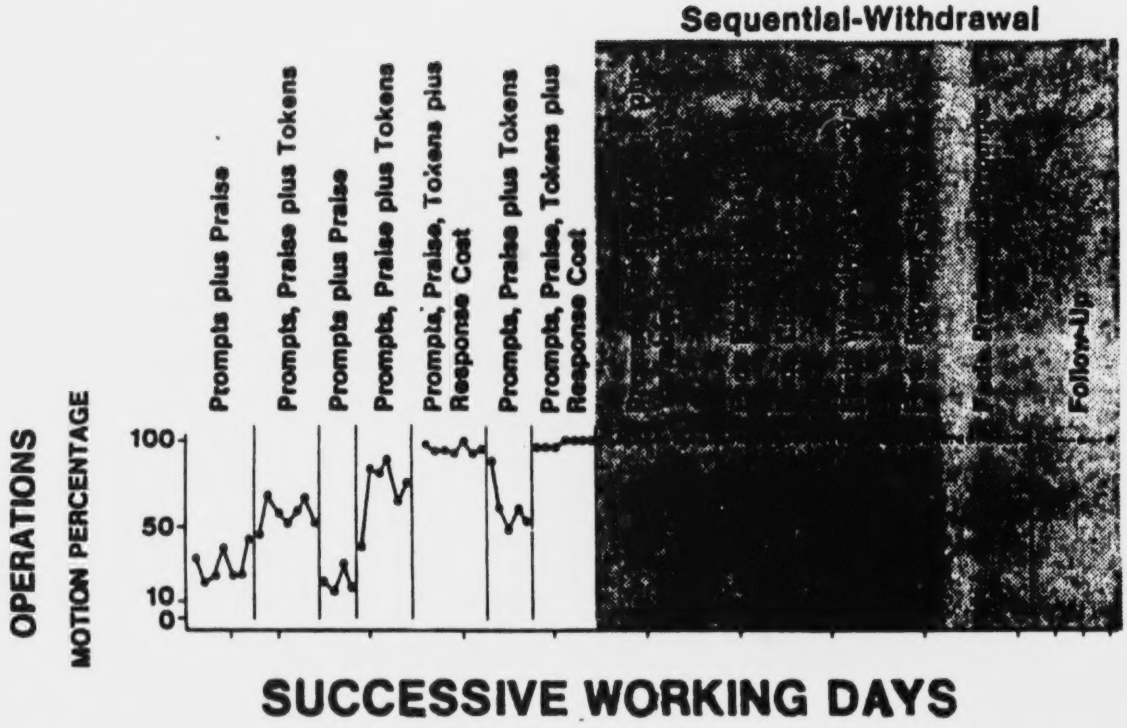


Figure 1. Sequential withdrawal assessment of maintenance of attending to task. Note. Adapted from Rusch, F.R., Connis, R.T., & Sowers, J., (1978) "The Modification and Maintenance of Time Spent Attending to Task Using Social Reinforcement, Token Reinforcement, and Response Cost in an Applied Restaurant Setting," Journal of Special Education Technology, 2, 33.

further strategies that appeared to promote maintenance.

Summary

These studies are important because they contribute to a better understanding of how to teach mentally retarded adults who often fail to discriminate the presence or absence of regulatory cues to maintain their behavior. However, they must be regarded as possessing only limited value. Specifically, persons trained via externally generated cues do not learn how to incorporate either highly specific, powerful routines limited to a relatively finite number of problems or, conversely, to use highly general, less powerful routines that are potentially applicable to a larger number of community-relevant problems. Typically, mentally retarded adults are instead instructed to acquire setting-specific skills and are expected to generalize the use of their newly acquired responses over settings and time. That the majority fail to maintain such skills is commonplace and contributes to a practical definition of mental retardation, that is, failure to maintain use of externally generated cues in everyday routines.

Strategies Incorporating Externally and Self-Generated Cues

The investigations discussed thus far have incorporated externally produced cues, that is those imposed by a significant change agent such as workshop staff, co-workers, or special educators. Strategies that pertain to external control are most useful in the initial stage of skill acquisition training and are applicable primarily to sheltered employment settings. Yet, if relied upon exclusively, external control procedures could present potential disadvantages to the development of independent behavior (Kazdin, 1973a). One problem associated with the external control approach is that it may preclude development of self-directed behaviors. In fact, this deficit has been identified as a primary obstacle to the community integration process (Wehman, 1975). In addition, change agents can become discriminative stimuli for the acquired work behavior, rather than stimuli that naturally exist in the environment (Redd & Birnbrauer, 1969). Potential problems arise when these agents are withdrawn from the training setting or fail to continue to influence adaptive behavior over time. This drawback places an upper boundary on maintenance training with externally generated strategies. Consequently, the external control approach is best conceptualized not as an end in itself but as a means to teach the individual to control his or her own behavior.

Rimm and Masters (1979) have suggested that self-control procedures are likely to be effective with individuals of almost any intellectual level, including mentally retarded persons. Unfortunately, strategies that rely upon self-control have not been widely used as a means to increase the independence of mentally retarded individuals (Mahoney & Mahoney, 1976).

Kurtz and Neisworth (1976) determined after an examination of the self-control research literature that self-reinforcement, self-monitoring, and antecedent cue regulation might be especially useful with mentally retarded individuals. Self-reinforcement involves the self-determination and the self-administration of reinforcement (Jones, Nelson, & Kazdin, 1977). Self-monitoring refers to an initial awareness of the occurrence or nonoccurrence of a behavior, followed by recording or reporting of that behavior (Nelson, 1977; Shapiro, 1981). Finally, antecedent cue regulation limits the range of discriminative stimuli controlling the desired behavior through procedures such as the presentation of picture cues (Connis, 1979; Martin, Rusch, James, Decker, & Trtol, 1982; Wacker & Berg, 1983). These strategies seem most promising for promoting the development and maintenance of independent behavior, because mentally retarded individuals would be able to evaluate and report their own behavior, manage consequences, and attend to antecedent cues.

A small body of research has concerned the use of self-control strategies in facilitating the acquisition and maintenance of work behavior. The major requirement of self-reinforcement is that the individual is free to administer self-reinforcement at any time, regardless of whether or not a particular response is performed (Skinner, 1953). The ability of mentally retarded individuals to administer and determine their own reinforcement was examined in three case studies reported by Wehman, Schutz, Bates, Renzaglia, and Karan (1978). Two of the investigations compared the effects of external, self-administered, and self-determined reinforcement upon the work production rates of three mentally retarded adults in a sheltered workshop setting. In the first study a severely retarded adult was introduced sequentially to external, self-administered, and finally self-determined reinforcment. Work production rates increased with the introduction of each new reinforcement phase. Interestingly, the self-determined reinforcement phase produced the highest level of production. In the second study, a mildly retarded adult was exposed to similar reinforcement conditions. As in the first study, each reinforcement phase produced higher production rates. The self-administered and self-determined phases were more effective than external reinforcement, with self-determined reinforcement being the most effective in increasing production rates.

The third case example compared the effects of noncontingent, externally administered, and self-administered reinforcement upon a profoundly retarded individual's production of floor pulleys. Unlike the other two studies, external reinforcement was the most effective, followed by self-administered, then noncontingent reinforcement. However, results from this last case study could perhaps have been influenced by the individual's level of mental retardation; because some minimal level of cognitive ability is required for self-administered and self-determined reinforcement, this subject's cognitive deficit may explain the failure to replicate. In addition, this individual may have adopted lenient standards for self-reinforcement which are typically associated with diminished performance; Wehman et al.'s (1978) finding that self-determined and external reinforcement can be equally effective in producing behavior change parallels those results generally reported in the self-control literature concerning nonretarded persons.

Helland, Paluck, and Klein (1976) compared the effects of self-reinforcement and external reinforcement on workshop task production. Twelve mildly and moderately retarded young adults were divided into two groups. Members of the self-reinforcement group were trained to self-compliment and select a reinforcer upon completion of collating ten sets of papers. The individuals in the external reinforcement group were reinforced and praised following every ten sets completed. Analysis of the results indicated that both reinforcement conditions significantly improved performance and that there was not a significant difference between the results of the two reinforcement methods. In other words, self-reinforcement was as effective as external reinforcement. This finding is especially noteworthy beccause the self-reinforcement group members were free of external supervision. This finding also suggests that the costs of teaching with self-control may be minimized. Further, self-control techniques may lend themselves to changing behavior on a large scale that would not be easily achieved with techniques involving external control.

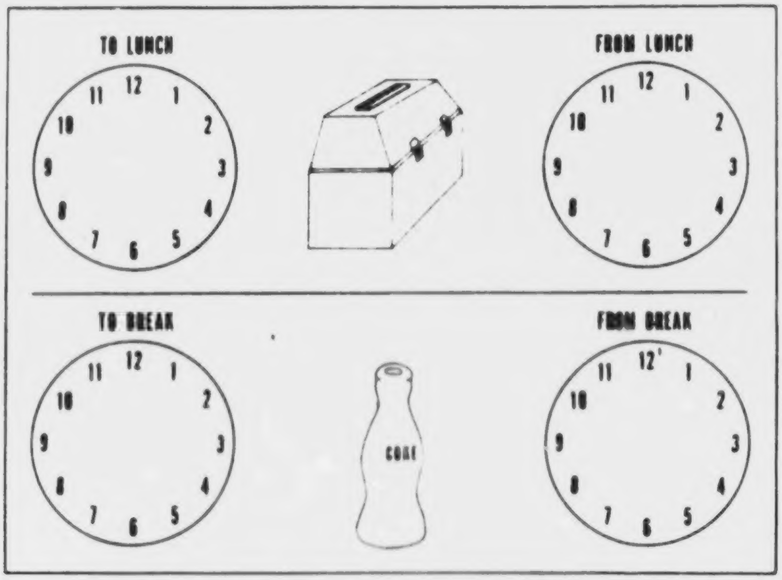
Matson and Martin (1979) evaluated a social learning package designed to improve production rate and various social skills of moderately severely mentally retarded adults employed in a sheltered workshop. Before starting work, seven workshop employees were requested to engage in a discussion regarding appropriate work behavior. Workshop staff praised each worker's discussion of target performance from the previous day's work for each target behavior. Information on how to improve those behaviors was also provided verbally, role-played, and repeated by workshop staff. The social skill training was successful in improving 12 target behaviors. Four weeks after training was terminated the target behaviors were assessed across three consecutive days. The follow-up probes indicated that the target behaviors had maintained in the absence of the social skill training package. A combination of factors may have accounted for these long-term benefits. As discussed above, it is quite possible that these employees "reacted" to the presence of workshop staff, even after the formal, daily training was terminated. It is also possible that these employees began to identify or "self-observe" situations that set the occasion for reinforcement.

In spite of its promise, self-monitoring alone may have inconsistent effects on behavior. For example, some studies have shown that self-observation does not alter behavior, whereas others show that when behaviors do change, the effects are transient (Kazdin, 1973b). For this reason, self-monitoring is typically utilized in conjunction with other techniques such as self-reinforcement. For example, in a more sophisticated study involving complex vocational tasks in a competitive employment site, Connis (1979) examined the effects of pictorial cues, self-recording, and praise on the sequencing of job tasks. Utilizing an antecedent-cue regulation procedure, four mildly to moderately retarded adults were introduced to the use of picture schedules and learned self-recording. Each subject's photo schedule depicted his or her assigned tasks. The results indicated that use of picture schedules combined with self-recording enabled subjects to sequence their job tasks successfully. Further, withdrawal of picture-cue training resulted in continued high levels of independent task change. Self-directed use of sequenced photographs enabled the individuals to maintain successfully the behavior independent of external supervision.

Finally, Sowers et al. (1980) taught time management in a restaurant setting using self-control strategies. Three mentally retarded adults, ranging from mild to moderate retardation, were trained in a competitive employment site to go to and return from lunch and breaks on time. After an initial baseline period, pre-instruction in time management, instructional feedback, and the use of a pictorial time card (an antecedent-cue regulation procedure) were introduced. (See Figure 2 for a representation of the antecedent cue used by Sowers et al. (1980.) This self-control training package enabled the individuals to learn quickly to manage their time. When preinstruction and instructional feedback were sequentially withdrawn, the time-management skills maintained. In summary, self-reinforcement procedures have included self-determined reinforcement, self-administered reinforcement, pictorial cues, self-recording, and preinstruction to train maintenance in the production of floor pulleys, in collating paper, in the sequencing of complex vocational tasks, and in time management.

Summary

Applied work behavior research typically seeks to teach individuals to acquire skills that have obvious importance. Traditionally, this research demonstrates that employees do in time acquire target skills as well as maintain these skills, which is often a secondary yet equally important focus of habilitation. As research has expanded to explore the "generality of these strategies" (e.g., across individuals with varying degrees of mental retardation), problems with focus have become apparent. It is often assumed that clients become aware of the focus of treatment and ultimately respond to target-setting characteristics. However, as more mentally retarded persons are being served in nonsheltered settings, strategies that they can utilize in the absence of external supervision appear to be needed. Most recently, strategies using both externally and internally generated cues have been demonstrated in sheltered workshop and competitive employment settings. Although self-control requires an external change agent to explain and model principles, techniques, and applications, the individuals themselves apply the procedures in their daily lives. Ultimately, the goal is for the individual to use these techniques in problems other than


TO LUNCH
FROM LUNCH
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FROM BREAK
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11
COKE

Figure 2. Time-management card used as an antecedent-cue regulator. Reprinted with permission from Sowers, J., Rusch, F.R., Connis, R.T., and Cummings, L.E. (1980) "Teaching Mentally Retarded Adults to Time Manage in a Vocational Setting" Journal of Applied Behavior Analysis, 13, 122.

those to which they were initially applied (Gifford, Rusch, Martin, & White, 1984).

Strategies incorporating self-generated cues seek to attain a measure of durability (maintenance). The implications of self-control strategies for long-term, community vocational placement are exciting. External control with self-control appears to be a promising means to facilitate long-term maintenance of the wide variety of complex survival skills that mentally retarded adults require to retain employment. Indeed, the use of either externally generated or both externally generated and self-generated cues warrants concentrated study.

Conclusion

A small but growing body of work behavior research has begun to examine maintenance of acquired work behavior. Most of these studies have used change agents who arranged antecedents or delivered consequences in order to change behavior. A few of these investigations have also assessed maintenance through follow-up probes to suggest that target behaviors maintain once treatment is withdrawn. Recently, self-control strategies have been advanced as a means to facilitate maintenance. These procedures could enable mentally retarded individuals to manage those cues that historically have been externally controlled. Self-monitoring, self-reinforcement, and antecedent-cue regulation are three strategies that appear to have utility for mentally retarded individuals.

The implications of these self-control strategies for long-term, community vocational placement are obvious. External-change agents must introduce the self-control procedures to the mentally retarded employee, train the employee in the use of the procedure, and, finally, withdraw from the environment to allow independent use of the self-control procedure. Combining external control of cues with the establishment of self-control of cues appears to be an excellent means to facilitate long-term maintenance of the wide variety of complex survival skills mentally retarded adults require to become independent of external control.

The implications of these strategies are obvious, both for community integration and for decision-making relating to the placement of mentally retarded adults in nonsheltered work settings. Future research might best be directed toward the development of a set of ideal training strategies (which currently do not exist) to direct the successful employment of mentally retarded adults. If applied successfully, such strategies could have a significant impact upon integrated mentally retarded adults by greatly reducing their risk of failure once they are employed.

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Competitive Employment: Utilizing the Correpsondence Training Paradigm to Enhance Productivity

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Increasing emphasis is being placed upon training mentally retarded adults to acquire valued work behavior (Cuvo, Leaf, & Borakove, 1978; Rusch, Connis, & Sowers, 1979; Schutz & Rusch, 1982; Sowers, Rusch, Connis, & Cummings, 1980). In addition to strategies for skill acquisition training, strategies involving skill modification (e.g., improvement of performance) and skill maintenance have also been used with mentally retarded adults. These strategies include environmentally produced cues and a combination of environmentally and worker-produced cues. Environmentally produced cues have typically included cues generated and monitored by a change agent, for example, trainers, co-workers, and supervisors. For example, Rusch, Weithers, Menchetti, & Schutz (1980) utilized co-workers and supervisors

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to provide feedback for topics repeated by a mentally retarded worker in a competitive work setting. Also, Sowers et al. (1980) utilized preinstruction, instructional feedback, and pictorial cues to develop independent time management skills among three prospective graduates of a vocational training program.

Environmentally produced and worker-produced cues have been included in a range of self-control procedures. Self-instruction (Bornstein & Quevillon, 1976; Meichenbaum & Goodman, 1969; Monahan & O'Leary, 1971), self-assessment, including components of self-monitoring, self-recording, and self-evaluation (Bolstad & Johnson, 1972; Connis, 1979), self-reinforcement (Bandura & Perloff, 1967; Masters & Santrock, 1976; Wehman, Schutz, Bates, Renzaglia, & Karan, 1978) and combinations of these self-control procedures (Horner & Brigham, 1979) are among the approaches that have been tried. The use of self-control procedures with mentally retarded individuals in vocational settings has also included sequencing job tasks via pictorial cues and self-recording activities (Connis, 1979) and utilizing self-determined and self-administered reinforcement to increase work production rates (Wehman et al., 1978).

In order to be effective, worker-produced cues first must be reliably produced; this, however, does not assure that such cues will act as controlling stimuli. There must also be an established history of contingencies between a cue, a target behavior, and a consequence. Correspondence training refers to a procedure for developing the necessary controlling relationships between the verbal cues of an individual (such as a mentally retarded person) and certain target behaviors (Israel, 1978; Israel & O'Leary, 1973; Karlan & Rusch, 1982; Risley & Hart, 1968). As it has evolved, the correspondence training paradigm consists of two sequentially applied procedures. During baseline, the performance level of the target behavior is evaluated. The individual is then reinforced for producing verbal statements concerning the performance of a target behavior (verbal training procedure) and again the performance level of the target behavior is evaluated. Mixed results with this procedure (i.e., some individuals showed changes in target responses whereas others did not) led to the subsequent use of a procedure whereby reinforcement is made available only for accurate verbal statements. Application of this correspondence contingency generally results in the development of verbal control over the target responses. Typically, the relationship between directed verbal statements and target behaviors (verbal or nonverbal) has been studied with nonretarded, young children (O'Leary & Dubey, 1979; Rogers-Warren & Baer, 1976). An exception was reported by Brodsky (1967) in which statements concerning appropriate social behavior were reinforced during interviews with an institutionalized, mentally retarded girl in an unsuccessful attempt to produce correspondence between her statements and her social interactions during interviews. However, this was an incomplete application of the correspondence paradigm as the shift to the "correspondence" contingency was not undertaken when the target responses failed to occur.

The present investigation was undertaken to determine whether application of the verbal correspondence paradigm (baseline-verbal training-correspondence training) to verbal statements (i.e., environmentally prompted, worker-produced cues) about task duration would produce changes (i.e., correspondence) in the actual time spent performing work tasks by mentally retarded employees. Work supervisors indicated the subjects in this investigation needed to improve in the area of "productivity" and noted specific tasks that needed to be performed faster. It was determined, through supervisor ratings and staff observations, that these subjects did not start/complete their assigned tasks at prespecified times. It was also acknowledged that each knew how to perform their tasks and had demonstrated that they knew when to start and how to complete their tasks on time. Therefore, three mentally retarded employees were reinforced for job-related time statements for the purpose of decreasing the amount of time they spent on select tasks and increasing the accuracy with which they started tasks at the specified time.

Method

Subjects

Three mentally retarded adults, one female and two males, ages 23, 28, and 33 years, participated. Standard psychological evaluations indicated Jane, Russ, and Luke scored in the moderate range of retardation, with IQ scores of 54 and 47 (Wechsler Adult Intelligence Scale) and 44 (Stanford Binet), respectively. Each subject possessed basic self-help skills, spoke adequately to be understood, and had the ability to get to and from work independently. Each subject had received vocational training in a food service vocational training program prior to employment and this investigation (Rusch, 1983a; Rusch & Schutz, 1981; Schutz & Rusch, 1982). Upon completion of the training program, Jane, Russ, and Luke were employed as full-time kitchen laborers.

Setting

This investigation was conducted in food service settings in three separate university dormitories. Responsibilities of the employees were similar, including management of an industrial dishwashing machine and a pots-and-pans washing machine, sweeping and mopping floors, cleaning grills, and stocking serving lines with dishes, silverware, and food.

Dependent Measures

Start time, task duration, and supervisor ratings served as the dependent measures. Specific starting and completion times for tasks and task duration were determined by food service supervisors. Supervisors acknowledge that starting a task 2 minutes before or after the specified start time was unacceptable.

Based on the supervisor's monthly ratings conducted prior to this investigation, the task target for Jane was sweeping and mopping the breakfast serving line; Russ's task was setting up the lunch line with hot food; Luke's task was sweeping and mopping the dinner serving line and its adjacent beverage hallway.

.Comparative validation data (Rusch, 1983b; Rusch & Mithaug, 1980; Rusch & Schutz, 1981) were collected on nonhandicapped co-workers during each subject's day off. These data were used to compare the performance (productivity) of the subjects to their co-workers and to assess whether supervisor-established time criteria were appropriate. Co-workers were pre-instructed to insure that they performed all steps that were contained in each task analysis. The first author read the subtask list (composed of eight subtasks for each job) to the co-workers and then asked the co-workers to repeat the list of subtasks themselves on each of the first two days data were collected.

Observation and Recording Procedures

Data collection included timing the duration of the target tasks with a stop watch, determining start and completion times by noting the time on a wall clock in each work setting, recording the number of subtasks correctly completed, the number of subtasks scored "not applicable" each work day, and the number of subtasks and statements scored "correct with one prompt."

Three staff members who were familiar with the subjects and their work tasks served as observers. Work experience of the observers included group counseling, vocational skills training, and house parenting with mentally retarded persons. Each was employed by a local rehabilitation services agency to provide follow-up training to persons once competitively employed. Before baseline data collection began, observers were supplied with lists of correct subtask responses, criterion start and completion time statements, clock orientation statements, and sample reinforcing statements. Typically, two practice sessions were sufficient to attain observer agreement of 85% or higher for task duration and 100% agreement for start and completion time statements and clock orientation statements.

Agreement Measures. Agreement checks were taken approximately once every five working days for each subject by having two observers independently record task duration, number of subtasks completed, number of statements made, and number of correction prompts required. The two observers stood at least 10 feet apart and recorded data without conversing. A total of 29 agreement checks were made for task duration with an average agreement of 91% (range from 86% to 100%). There were no disagreements for subtask completion, time or clock orientation statements, or correction prompts.

Agreements were collected once for co-workers during each phase that co-worker data were collected except for one worker. In Jane's setting, co-workers did not perform the target task (sweeping and mopping the breakfast serving line) on her days off. A total of seven agreement checks were collected for co-workers with an average of 96% (range from 90% to 100%). There were no disagreements for subtask responding.

Experimental Design and Conditions

A multiple-baseline design across subjects and tasks was used to assess treatment effectiveness (Hersen & Barlow, 1976). Experimental conditions are described below.

Baseline. Baseline data were collected for 12 days for Russ and Jane and 10 days for Luke. Subjects received no instructions or feedback regarding task start time, completion time, or duration.

Co-worker Prompt. Russ and Luke received two days of co-worker prompts while wearing a wrist watch and Jane received three days of co-worker prompting and one day of watch wearing. Prompting was initiated on Day 20, Day 28, and Day 37 for Russ, Jane, and Luke, respectively. Co-workers instructed each employee approximately two to five minutes before they began that they were to start the task at a specific time and complete it at a specific time. This was done because Russ was inadverently prompted on Day 20 by a co-worker. Therefore, each of the two remaining subjects (Jane and Luke) were prompted by co-workers to control for the sequence by which interventions were introduced across subjects (Kratochwill, 1979).

Reinforce Say. Two to five minutes before the designated tasks were to begin, the worker was instructed to say when he or she would start and complete the target task. The worker was asked to describe how the start and completion times looked on their watches/wall clocks (i.e., "The big hand will be on three and the little hand will be on nine," for 9:15). This clock orientation procedure was used to insure that subjects demonstrated basic understanding of the time statements and were not simply repeating the statements. Also, when each subject was at the midpoint of the allotted task time for their respective tasks, they were instructed to say when they would finish the task. This procedure was followed to control for possible memory deficits. All workers were verbally praised for their two verbal start and completion time statements, their two-clock orientation statements describing start and completion times, and their one midpoint completion time statement. Workers were verbally prompted to insure they made the five statements.

Reinforce Correspondence. During this condition, workers were instructed and prompted to make the five time statements as in the previous condition, but the worker was reinforced only for positive correspondence between his time statement and task performance. Reinforcement consisted of verbally praising the subject for his or her work performance. Verbal praise was shown to influence the rate of each subject's work performance prior to the onset of this investigation. Time and clock orientation statements were responded to in a neutral way (i.e., "OK").

Reinforce Say (30 Minutes). An additional five minutes were added to the 25-minute criterion on Day 73 after the evening supervisor in Luke's kitchen was given the average task time for Days 46 through 69 for Luke and his co-workers, which were 31.2 minutes and 32.8 minutes, respectively. Given this information, the supervisor agreed that 30 minutes was a more appropriate criterion.

Supervisor Validation

After approximately 10 training days, supervisors were asked about each subject's productivity. Also, at the end of this study, supervisors were asked about the workers' task performance duration and whether the workers' performance of the task was a problem. The rating supervisor remained the same for each subject across the two ratings.

Results

Figure 1 presents task duration, expressed in minutes, for Russ, Jane, and Luke. The broken lines indicate supervisor-established duration criteria. As can be seen from Figure 1, during the Baseline condition, Russ, Jane, and Luke did not meet the supervisor-established criteria 8 of 12, 7 of 12, and 10 of 10 work days, respectively. When the Co-worker Prompt condition was introduced, only Russ met his established criterion. The Reinforce Say phase resulted in Russ maintaining his criterion and Jane performing at her criterion for the duration of the study, with the exception of one and three work days, respectively. Luke achieved criterion only once during Reinforce Say. However, inspection of Figure 1 demonstrates that there was an initial and lasting change in level from Baseline. There was no further change in performance during Reinforce Say, Reinforce Correspondence,

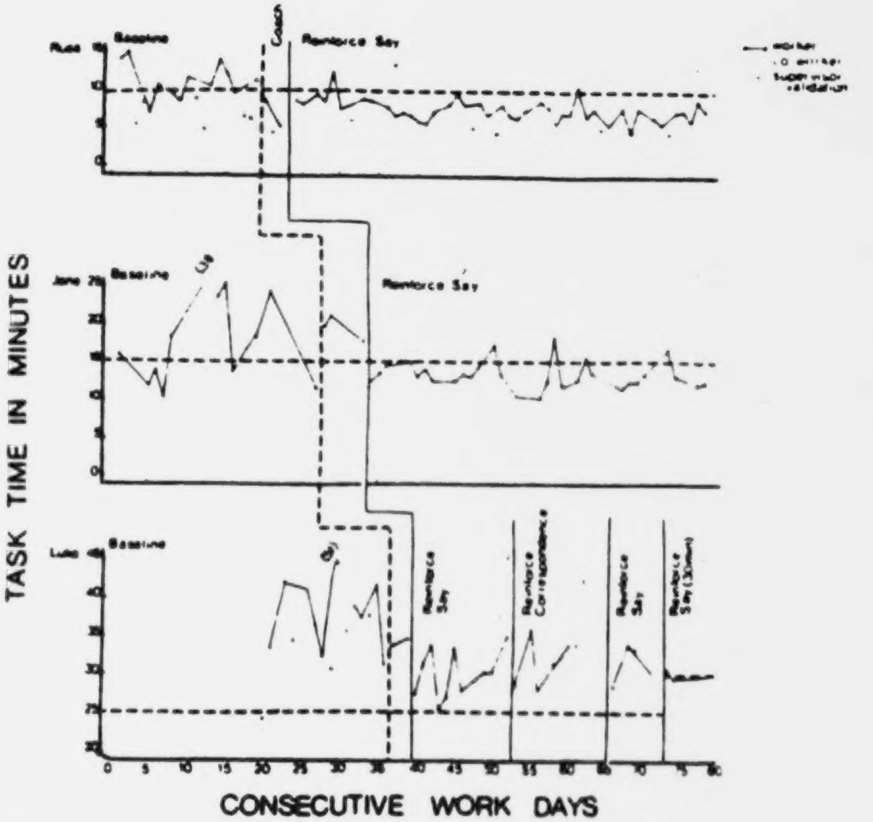

Figure 1. Number of minutes taken (task duration) to complete each task for subjects and coworkers. The horizontal, dashed line is the supervisor-established time allowed to complete the task.

Figure 1. Number of minutes to complete each task for subjects and co-workers.

and the final Reinforce Say conditions. It must also be noted that the nonhandicapped co-workers met the criterion established by the supervisor for this task only once. This is in sharp contrast to the co-worker data obtained for Russ's task which shows the criterion established by the supervisor being consistently surpassed. After Luke's criterion was increased by 5 minutes to a 30-minute time criterion, he attained the new supervisor-established criterion in two of the three sessions in this final phase.

Russ's mean performance times were 11 minutes, 7.33 minutes, and 7.63 minutes during the Baseline, Co-worker Prompt, and Reinforce Say conditions, respectively. Comparatively, his co-workers performed the same task 73% faster during Baseline (an average of 6.75 minutes) and 70% faster during the Reinforce Say condition (an average of 4.97 minutes).

Table 1 indicates for each condition the number of work days in which the task was started at the correct time. Russ had correct start times during only 1 of 12 baseline work days; co-workers exhibited correct start times during only 2 of 6 baseline work days. Correct task times increased to 50 of 52 during the Reinforce Say condition; co-workers correctly started their tasks only 1 of 4 work days during this condition.

Jane's mean performance times were 18.22 minutes, 19.63

minutes, and 13.42 minutes for the Baseline, Co-worker Prompt, and Reinforce Say conditions, respectively. During Baseline, Jane correctly started the target task only 1 of 12 times; 17 tasks were begun correctly during Reinforce Say (out of 29 work days).

Figure 1 shows that Luke did not meet his 25-minute criterion during the Baseline or Co-worker Prompt conditions, and met the supervisor-established criterion 2 of 16 work days during the investigation. Luke's mean performance times for Baseline, Co-worker Prompt, Reinforce Say, Reinforce Correspondence, Reinforce Say (25-minutes), and Reinforce Say (30-minutes) were 38.42 minutes, 34 minutes, 30.25 minutes, 31.57 minutes, 31.38 minutes, and 29.22 minutes, respectively. Comparatively, his co-workers mean performance times were 31.13 minutes during Baseline, 32.57 minutes during Reinforce Say, 33.85 minutes during Reinforce Say, 33.85 minutes during Reinforce Correspondence, 33.25 minutes during Reinforce Say (30-minutes), and 35 minutes during the 25-minute Reinforce Say conditions. Table 1 reflects a total of 2 of 10 correct start times for Luke and 0 of 6 correct start times for his co-workers. All of Luke's tasks were started on time during the two 25-minute Reinforce Say conditions; only 1 of 4 tasks were started on time by co-workers. During the Reinforce Correspondence condition Luke started 4 of 4 tasks on time, whereas co-workers started only 1 of 5 tasks on time. Finally, during the 30-minute Reinforce Say condition, Luke started tasks 1 of 3 times within 2 minutes of the prespecified start time (plus or minus); co-workers did not start the task on time on the single occasion that was monitored. Luke's co-workers performed the task 23% faster during Baseline than Luke did, while Luke completed the job 7% faster in each of the Reinforce Say (25 minutes) and the Reinforce Correspondence conditions, and 4% faster during the 30-minute Reinforce Say condition. On Day 73, Luke's criterion time was increased to 30 minutes and he came within 44 seconds of the new criterion.

Validation. A supervisor in each setting was asked to state whether the subjects' duration of task performance (productivity) was a problem after approximately 10 training days in the Reinforce Say condition and at the end of the study. Russ, Jane, and Luke's supervisors stated that productivity and starting times were not a problem during Reinforce Say or at the completion of the study. Although Luke's supervisor stated speed was no longer a problem, Luke performed the job near criterion on only one day during the Reinforce Say condition, according to direct observation measures.

Table 1

Number of Work Days That Subjects and Co-workers Started Tasks Within Two Minutes of the Pre-specified Start Time (plus or minus).

Task	Baseline	Reinforce Say (25 min)	Reinforce Correspondence	Reinforce Say (25 min)	Reinforce Say (30 min)
Task 1					
Subjects	1 or 12 (8%)	50 of 52 (96%)			
Co-Workers	2 of 6 (33%)	2 of 4 (50%)			
Task 2					
Subjects	1 of 12 (8%)	17 of 29 (59%)			
Task 3					
Subjects	2 of 10 (20%)	10 of 10 (100%)	4 of 4 (100%)	3 of 3 (100%)	1 of 3 (33%)
Co-Workers	0 of 6 (0%)	1 of 2 (50%)	1 of 5 (20%)	0 of 2 (0%)	0 of 1 (0%)

Discussion

The results of this investigation demonstrate that with mentally retarded workers, application of only the verbal training procedure of the verbal correspondence training paradigm was sufficient to establish and maintain verbal control of the task completion behavior. For one individual, verbal training produced a noticeable level shift but did not result in attainment of the criterion performance. Unfortunately, selection of a criterion by the employment supervisor, which was demonstrated to be too strict by social validation data, confounded the application of the correspondence contingency with the third subject. Had the more reasonable 30-minute criterion been used during correspondence training, Luke would have received reinforcement for correspondence in two of the first three sessions in this phase. Such a level of feedback might have stabliized performance at the more reasonable criterion level of 30 minutes; as it is, during intervention phases, the revised 30-minute criterion would have been met in 11 of 20 training sessions as compared to zero of 10 for baseline sessions, which is indicative of a direct relationship between part of the verbal correspondence training paradigm (verbal training procedure) and improved work productivity for this third subject. These findings extend the existing correspondence literature in several ways.

First, the results of this study contradict Brodsky's (1967) unsuccessful work with mentally retarded adults. Brodsky was unable to effect changes in nonverbal social behavior by reinforcing verbal statements. In the present investigation, reinforcing verbal behavior before the subject engaged in the job enhanced productivity and thus supports the concept that a relationship exists between verbal and nonverbal behavior. In fact, it should be noted that, although application of the correspondence training phase was anticipated, reinforcement of verbal statements alone brought about substantial changes with all of the subjects.

Second, use of verbal self-direction has been extended to the competitive work environment with mentally retarded adults. Brodsky conducted his work in an institution for mentally retarded persons. The setting for the present investigation was an applied, noninstitutional setting, and the dependent measures were socially valued. Specifically, subjects in this investigation had to improve their work performance if they wanted to continue to be employed.

One important feature of this investigation was the use of supervisor validation of task performance, a form of social validation (Kazdin & Matson, 1981). Supervisors in each setting indicated that each subject's overall productivity (i.e., task duration) was appropriate after approximately ten days of training and, again, at the end of the study. However, these descriptive social validations conflicted with direct observation for one subject; Luke did not perform at or below his criterion (except for one day) during the Reinforce Say condition. One possible basis for this discrepancy is that Luke's supervisor may have observed him on Day 43, the day he completed the task in approximately 26 minutes; therefore, the supervisor may have based the performance rating on an atypical performance. It is also possible that Luke's supervisor may have noted his general reduction of task time and interpreted this improvement as being within or near the established criterion. This second explanation is more plausible, because it is unlikely that the supervisor could make accurate observations of Luke's task duration along with her many kitchen supervising duties. Such a discrepancy suggests that the general use of supervisor-generated criteria for vocational behavior may require careful descriptive validation to assure their correspondence to actual performance demands (Rusch, 1983a; White & Rusch, 1983).

With respect to the effectiveness of self-directed cues, O'Leary & Dubey (1979) suggested that the relevancy of cues affects the probability of correct responding. Similarly, Mischel & Patterson (1976) found that the effects of self-instructions were greater when the instructions were relevant to the future task for children. Task-relevant cues and task-irrelevant cues were used in an attempt to increase attending behavior; results indicated that task-relevant self-instructions were more effective. The external cues used in this investigation were time specific (e.g., "I will start the sweep and mop job at 9:30.") for start and completion of tasks. It is unlikely that more general statements such as, "I will finish this task on time" would have the same positive effects. This type of statement was inadvertently prompted by co-workers when one of the subjects purchased and wore her watch to work. In an effort to control for sequence effects, watches were purchased for each of the other two subjects and their co-workers were asked to tell each of these subjects to be sure to use his watch. Neither subjects nor co-workers were provided specific verbal cues. Cues utilized took the form of, "Don't forget to get your job done on time, use your watch." In the present study, during the Reinforce Say Condition, start and completion time cues were delivered between 2 and 5 minutes before the specified start time. Thus, it is not known how a cue delivered 30 minutes before the start time or a cue delivered at the start of the work shift would affect task performance. Lack of positive effects would be evidence of the importance of temporal relevance to verbal correspondence.

Although application of the correspondence training paradigm was effective in reducing task duration for these three employees, the results are limited to the extent that it is not clear whether reinforcement of time statements, clock orientation statements, or both the time and clock orientation statements facilitated the results. There is a definite need for further research to replicate these findings and to determine what aspects of the training package were most effective. Also, because the subjects were specifically rehearsed in their verbal statements, the generality of these results as support of correspondence training must be viewed with caution. Although providing a model of what is to be said insures that correct verbal cues will occur 100% of the time, it imposes greater environmental control over the worker's production of self-directing cues. The recommended procedure would be to use questions about what should be done rather than statements of what to say as the setting cues to elicit verbal, self-directing cues.

In summary, this study applied verbal correspondence training to the reduction of task duration with three mentally retarded employees. As a result of this investigation, two of the three subjects remained below their supervisor's established criteria, with few exceptions using only the first of two procedures typically used within the correspondence paradigm. The third subject reached his criterion only after the time criterion was modified to reflect objective data concerning task time requirements.

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Teaching Task Sequencing via Verbal Mediation

Frank R. Rusch, James E. Martin, Thomas R. Lagomarcino,
and David M. White

Rusch, Martin, and White (1985) recommended that persons with mental retardation be taught to control their own behavior. Several strategies were recommended by Rusch et al. (1985), including the use of verbal mediation. *Verbal mediation* refers to teaching the individual to guide his or her behavior through the use of their own verbal behavior. For example, Crouch, Rusch, and Karlan (1984) demonstrated that three employees with moderate mental retardation could decrease the time they spent completing target tasks by having the workers accurately state (verbal behavior) when they were to start and complete their assigned tasks. In the Crouch et al. (1984) study, verbal behavior was reinforced prior to actual performance.

Over the past two decades research has been directed toward examining the correspondence between an individual's

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verbal and nonverbal behavior. Only recently, however, has this relationship been examined among persons with mental retardation. Except for the Crouch et al. (1984) study, these prior studies have reinforced the correspondence between what one says and does (cf. Karlan & Rusch, 1982). Risley and Hart (1968), Rogers-Warren and Baer (1976), and Jewett and Clark (1977) used a do-then-say training sequence to develop correspondence between preschool-aged childrens' verbal and nonverbal behavior. The children were asked to report verbally that they had played with a particular toy.

Correspondence was measured by the accuracy of the verbal reports. The children were reinforced for stating accurately the toys with which they planned to play. In contrast, Baer, Williams, Osnes, and Stokes (1984) utilized a say-then-do sequence to develop correspondence. The children promised (say) to play with a particular toy (do). Correspondence was measured by observing whether or not the child played with the targeted toy. The children were reinforced only if they played with the toy (do) that they said they were going to play with (say).

Other studies have compared the effectiveness of a say-then-do sequence versus a do-then-say sequence to promote correspondence (e.g., Israel & O'Leary, 1973; Karoly & Dirks, 1977). Except for the Crouch et al. (1984) and Baer et al.

(1984) studies, no investigation has focused upon the correspondence between what a person states will be done, and then whether the behavior occurs (cf. Karlan & Rusch (1982). Israel (1978) suggested that this verbal-nonverbal sequence (say-do) may be an efficient strategy for training that would lead to a rapid development of correspondence.

Gifford, Rusch, Martin, and White (1984) suggested that the use of verbal mediation strategies with adults with mental retardation may improve their chances of remaining employed. The purpose of the present investigation was to determine if verbal sequence training would be an effective strategy in teaching a woman with moderate mental retardation to sequence multiple tasks associated with her job. Prior research has shown that workers with moderate mental retardation can decrease the time they spend working if they learn to state when they are to start and stop their assigned tasks (Crouch et al., 1984). Further, recognizing that work routines may change from day to day, we examined the employee's ability to change her schedule through the use of her verbal behavior. Therefore, the present investigation sought to determine if verbal sequencing could inhibit the performance of targeted nonverbal behaviors (cf. Karlan & Rusch, 1982).

Method

Subject

Linda, a 35-year-old woman with Down syndrome, had an estimated full-scale IQ of 55 (WAIS). This score and impairments in her adaptive behavior resulted in her being classified as moderately mentally retarded. She had lived at home with her parents until she moved to a large, intermediate-care facility for adults with developmental disabilities. Linda worked in a sheltered workshop until she became involved in a supported employment program (Lagomarcino, 1986).

Setting

Linda was employed as a lobby clean-up person at a fast-food restaurant. A job analysis identified preparing the dining room (set-up) and cleaning the counter and eating areas at the end of the day (clean-up) as problems (Rusch & Mithaug, 1980). These jobs were further broken down into subtasks that required particular attention because the employer identified them as important tasks to complete. Table 1 includes a complete list of tasks that were associated with these two periods of Linda's work schedule.

Table 1

Tasks Associated with Set-up and Clean-up.

Set up Tasks	Final Clean-up Tasks
1. Use restroom at 10:40	1. Begin to sweep entrance at 1:10
2. Gather materials (four items)	2. Sweep counter area
3. Clock in at 11:00 AM	3. Sweep eating area
4. Check storage cabinet for materials (four items)	4. Sweep party room
5. Clear paper from tables	5. Empty ashtrays
6. Check and remove garbage (3 cans)	6. Obtain mop and mop bucket
7. Take garbage bags out immediately	7. Mop counter area
8. Return trays to front	8. Mop main eating area
9. Clean all tables and seats in eating area (three sub-tasks)	9. Mop party room
10. Check and prepare used baby chairs if necessary	10. Clear tables, return trays, garbage
11. Spot sweep counter and eating area (2 areas)	11. Put away all materials and clock out at 2:00
12. Check restrooms (2 rooms)	

Dependent Measures

Dependent measures were: (a) percentage of tasks completed independently and in sequence, and (b) percentage of tasks said independently and in sequence. Independent task change was selected as the primary dependent measure (cf. Connis, 1979) because Linda's shift supervisor expressed concern that she was not completing independently all the required tasks. Independent task change was defined as beginning and completing the assigned task in the proper sequence without assistance. The second measure was the percentage of tasks said correctly and in sequence. Tasks said independently was defined as verbally stating the assigned tasks in the correct sequence without assistance prior to starting work.

Observation and Recording Procedures

Data were collected Monday through Friday during Linda's entire work shift (Monday-Thursday, 11:00-2:00, Friday, 11:30-3:00). Job coaches recorded whether or not Linda completed a task independently, required assistance, or did not have the opportunity to complete the task (e.g., when a co-worker returned the trays before Linda had an opportunity to return the trays). Saying the tasks correctly and in sequence was recorded during the verbal training conditions.

Observers (Job Coaches). Four job coaches collected data and implemented the training procedures (Renzaglia, 1986). Before collecting data in this investigation, observers/coaches reviewed the definitions of the target behaviors and the training procedures and were then instructed in the observation and recording procedures. Each observer/coach had to obtain an 80% level of inter-observer agreement for two consecutive work shifts before participating in this study. All observers/coaches met on a weekly basis to review their observation, recording, and training procedures throughout this investigation.

Observer agreement. Inter-observer agreement was assessed on 20% of Linda's work days. Inter-observer agreement was assessed on both dependent measures. On these occasions, a second observer simultaneously and independently observed and recorded Linda's performance. Inter-observer agreement scores were calculated by dividing the number of agreements by the number of agreements and disagreements and multiplying the quotient by 100. Inter-observer agreement scores for independent task change ranged from 78% to 100%, with a mean of 95%. Inter-observer agreement for percentage of tasks said correctly ranged from 82% to 100%, also with a mean of 95%.

Experimental Design and Conditions

A multiple-baseline design and reversal across two job periods was used. Specifically, these periods included the

Set-up and final Clean-up periods (Table 1). This study incorporated four experimental conditions conducted over 93 working days. The phases included: (a) Baseline 1,(b) Verbal Training 1, (c) Baseline 2, and (d) Verbal Training 2.

Baseline 1 and 2. On the first day of work the assistant manager told Linda her job responsibilities, which consisted of completing 23 tasks across two periods. During Baseline conditions, intervention procedures similar to those reported by Connis (1979) and Sowers, Rusch, Connis, and Cummings (1980) were utilized to ensure task completion. Linda was given verbal feedback if a task was done incorrectly or out of sequence. For example, if Linda cleaned the tables incorrectly, the job coach said, "You need to clean the table again, it is still dirty." If Linda performed a task out of sequence, the job coach told Linda the task she missed and asked her to perform the task again. Linda was occasionally praised for tasks completed correctly and in sequence. If a task was not initiated within 30 seconds after completion of the previous task, the job coach provided a verbal cue to begin the next task (e.g., "Linda, you need to empty the back garbage.").

During the Set-up period, Baseline 1 was in effect for 11 consecutive working days and 4 consecutive working days Verbal Training 1. Baseline procedures were introduced on the fifth day of this study during the Clean-up period and continued for six working days (see Baseline 1, bottom panel, Figure 1). Baseline procedures were reintroduced on Day 42 and continued for 11 days (refer to Baseline 2, bottom panel, Figure 1).

Verbal training. Every morning, before Linda started work, a job coach sat with her at a table in the eating area and told her step by step what she was to do. For example, the coach would say, "Linda, you use the restroom at 10:40, then you go into the back room and get your materials, then you clock-in at 11:00..." and so on. The coach would wait 3 seconds between stating each sequenced task. After the entire sequence was stated, the job coach said, "Linda, now tell me what you are supposed to do and don't forget to say everything in the right order." Verbal correction was provided for tasks Linda said incorrectly or out of sequence; praise followed most of the statements that were said in the correct sequence.

Linda was prompted if she did not say the next task in the sequence within 30 seconds. If she did not respond immediately after the prompt, the coach would give a specific verbal prompt (i.e., "After you return the trays, you clean the tables."). When Linda said a task out of sequence, the job coach would correct her and then state the correct task in the sequence that was to be stated. During the Set-up period, these procedures continued for 30 and 38 days for

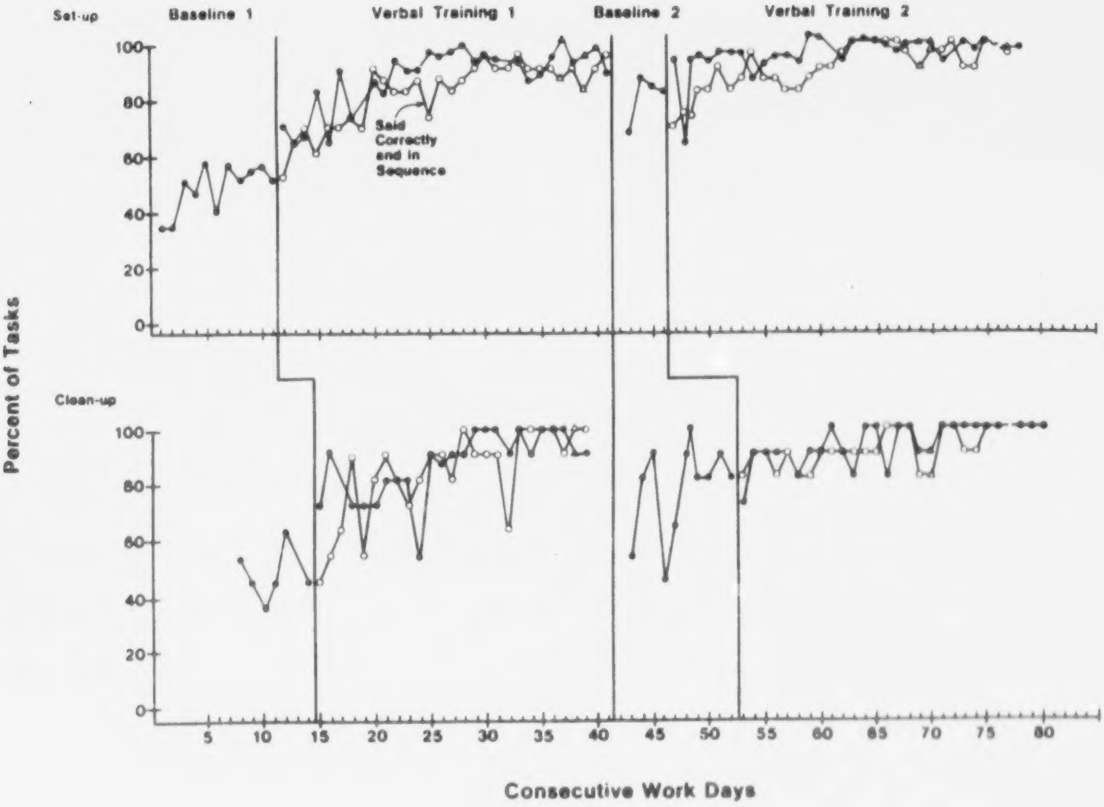

Figure 1. The percentage of tasks said independently and in sequence (open circles) and the percentage of tasks completed independently and in sequence (closed circles). The closed triangles represent days when Linda was told not to perform target tasks. The open triangles represent her verbal behavior.

Verbal Training 1 and 2 conditions, respectively. Verbal training was introduced during the Clean-up period on Days 15 and 53, respectively.

To examine further the relationship between Linda's verbal behavior and her nonverbal behavior, Linda was instructed not to complete several tasks during the first and second Verbal Training conditions (Work Days 37, 38, 39, 69, and 70). During Verbal Training 1, the job coach stated three tasks that Linda was not to perform. After Linda was instructed not to complete these tasks, she then repeated the three tasks she was not to perform. This step continued until Linda was able to state correctly the three tasks she was not to do (see Table 2).

Results

Figure 1 shows the percentage of tasks said and completed independently and in sequence across the Set-up and Clean-up periods. The top and bottom panels show a consistent and progressive increase in Linda's ability to say the tasks that she was required to perform (closed circles), and in her performance of these tasks (open circles). There was only one occasion where the percentage of tasks completed decreased to baseline levels (see Consecutive Work Day 24, bottom panel); on all other work days the percentage of tasks completed were above those observed during Baseline. Once Linda received instruction to sequence verbally the tasks she was to complete during the Set-up and Clean-up periods, she completed more tasks independently. As Linda learned to say the tasks in the correct sequence, her performance also improved.

Although Linda's performance during both second Baseline periods did not reverse to her performance during both first Baseline periods she did perform fewer tasks independently and in sequence during these two conditions compared to tasks performed independently and in sequence during the majority of the work days associated with Verbal Training 1 and Verbal Training 2. After verbal sequence training was reintroduced (Verbal Training 2), Linda's work performance quickly returned to Verbal Training 1 performance levels during the Set-up amd Clean-up periods.

Table 2 gives the results of Linda's not performing target tasks. During the Set-up period Linda said 100% of the tasks she was not to perform during pre-instruction (Say Immediate), said these tasks 57% of the time in sequence (Say in Sequence), and did not perform any of the tasks.

During clean-up, Linda said 67% of the tasks she was not to perform (Say Immediate) after she was told which tasks not to complete and said 68% of the tasks she was not to perform in the entire sequence during preinstruction. She did not do 10 of 13 target tasks (77%).

Table 2

Number of Tasks Said Immediately and in Sequence (Seq) and Number of Tasks Not Performed (Do Not).

		Set-Up			Clean-Up		
Work Day	Tasks	Say (Immediate)	Say (Seq)	Do Not	Say (Immediate)	Say (Seq)	Do Not
37	Trays, back garbage, bathrooms	3/3	2/3	3/3		1/2	2/2
38	Sweep eating area, empty ash trays, mop party room				2/3	3/3	2/3
39	Outside garbage, clear paper from tables, baby chairs	3/3	1/3	3/3			
39	Sweep counter, sweep party room, mop counter				2/3	2/3	2/3
69	Trays, back garbage, bathroom	3/3	2/3	3/3		1/2	2/2
70	Sweep eating area, empty ash trays, mop party room				3/3	3/3	2/3
	Total	9/9 (100%)	5/9 (57%)	9/9 (100%)	7/9 (67%)	9/13 (68%)	10/13 (77%)

Discussion

The present investigation demonstrated that an employee with moderate mental retardation could learn to complete her work assignments independently by learning to sequence her verbal behavior. The target employee in this study was at risk of losing her job at a fast-food restaurant because she would frequently forget to complete her assigned tasks or fail to complete her assigned tasks in the sequence in which they were to be performed. This employee did not lose her job after she was taught to complete her assigned tasks in the correct sequence and independently via a verbal training procedure.

Demonstrating the relationship between one's verbal and nonverbal behavior extends the applied research literature in several important ways. First, existing literature has shown that persons with mental retardation can respond to stimuli that are selected, arranged, and monitored by change agents (cf. Rusch et al., 1985). Only a few studies have investigated the importance of verbal behavior in teaching independent performance (Crouch et al., 1984). The present investigation extends the Crouch et al. (1984) study, however, by investigating the role of verbal-sequence training in relation to numerous tasks that were to be performed. Crouch et al. (1984) studied the ability of target employees to state only the time they were to start and end the work day.

Second, although this investigation did not inhibit inappropriate behavior as described by Karlan and Rusch (1982), this study did examine whether or not saying what one should not do (say not) would lead to not doing (do not), which is consistent with Karlan and Rusch's recommendation that verbal behavior can be used to inhibit performance. Similar research has been reported by Kendall and Finch (1976) in their effort to reduce rapid, impulsive "switching" from task to task using verbal self-instructions. Kendall and Finch taught a single child to make "Do not switch, finish the task" verbalizations. The present investigation extends this research by incorporating a say not-do not sequence across numerous tasks at different points in time (i.e., during set-up and clean-up). Also, during the say not-do not work days, the target employee would say aloud what she was not to do during the work day. For example, Linda would say aloud, "I take out the front garbage, but I don't take out the back garbage today!"

The results of this investigation are in conflict with results reported by Guevremont, Osnes, and Stokes (1986). Guevremont et al. (1986) found that two young boys did not reliably engage in target behaviors when their verbalizations were only reinforced. They found that the relationship between the childrens' performance of the behaviors that they said they would do was enhanced markedly when the correspondence between what was said and done was reinforced. The results of this study may differ from the results of the Guevremont et al. (1986) study because the present study investigated the verbal-nonverbal relationship for an extended period of time (i.e., over many more days), allowing the effects of verbal behavior alone to be more fully examined.

In summary, this study examined the relationship between what one says and does by teaching a woman with mental retardation to sequence work tasks verbally. The results of this study suggest that verbal rehearsal may be a very valuable teaching strategy that can be used to direct target nonverbal behaviors. In this investigation, when the target employee accurately said what she was going to do during a pre-instructional period, she completed the assigned tasks independently and in sequence. In addition, when she failed to say what she was going to do independently and in sequence, she failed to complete more of her tasks during the work day.

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Competitive Employment: Teaching Mentally Retarded Employees Self-Instructional Strategies

Frank R. Rusch, Tamara K. Morgan, James E. Martin
Maria Riva, and Martin Agran

Over the past few years several studies have suggested the skills, the procedures, and the structure that sheltered workshop programs should adopt to facilitate the placement of mentally retarded individuals into competitive employment (Rusch, 1983; Rusch & Mithaug, 1980; Rusch & Schutz, 1979; Schutz & Rusch, 1982; Sowers, Thompson, & Connis, 1979; Wehman, 1981). These programs have demonstrated that a community-oriented, behavior-analytic approach can facilitate the acquisition of requisite social and vocational work behaviors (Connis, 1979; Cuvo, Leaf, & Borakove, 1978; Rusch, 1979a; Rusch & Menchetti, 1981; Rusch & Schutz, 1981; Schutz, Jostes, Rusch, & Lamson, 1980; Wehman, Hill, & Koehler, 1979). Although these programs have enabled many mentally retarded employees to work independent of sheltered workshop environments, an alarming number have been terminated from

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competitive employment because of social or vocational incompetence (Greenspan & Shoultz, 1981; Greenspan, Shoultz, & Weir, 1981; Kochany & Keller, 1981; Martin & Agran, in press; Wehman, 1981).

Loss of employment may be related to the methods incorporated by placement coordinators to maintain setting-relevant survival skills (Rusch, 1983). Typically, once a mentally retarded individual has beem placed and efforts have been directed toward identifying and training the new employee to acquire the skills essential for employment success, the placement coordinator withdraws him- or herself. Unfortunately, these withdrawals often are not systematically planned and evaluated. Consequently, critical skills are not maintained or are not maintained in the presence of setting-relevant stimuli (Rusch & Kazdin, 1981). Typically, maintenance is an accident of the placement process. It appears particularly important to consider procedures that enhance the maintenance of survival skills in these nonsheltered work settings, separate from reliance upon a placement coordinator's continual and direct involvement. Recently, Gifford, Rusch, Martin, and White (1984) suggested that mentally retarded employees may be capable of becoming active participants in maintaining their own employment skills. Among the strategies suggested by Gifford et al. (1984) to enhance autonomy (i.e., maintenance), self-instruction appeared to be among the more promising.

Self-instruction has been identified as the procedure of verbally directing oneself, either overtly or covertly, to prompt, direct, or maintain behavior (O'Leary & Drabman, 1971). Since the pioneering work of Meichenbaum and Goodman (1969a, b; 1971), in establishing verbally mediated self-control through cognitive self-instructions with impulsive children, a number of articles have appeared in this area. (See Goetz & Etzel, 1978; Israel, 1978; O'Leary & Dubey, 1979; Rosenbaum & Drabman, 1979, for excellent reviews.)

According to Karlan (1980), research on self-instruction as a means to modify behavior focused initially only upon changing verbal behavior. Subsequently, individuals were trained directly to self-instruct as a means of modifying target behavior. These first two approaches assumed a direct relationship between what was said and what was done, suggesting speech may be a verbal chaining process. More recently, research has examined the relationship between, and the procedures used to develop correspondence between, what a person says and what he or she actually does (cf. Karlan & Rusch, 1982). To date, the research literature has examined primarily self-regulation of internal verbal stimuli with children and adults of normal intelligence (Bornstein & Quevillon, 1976; Bryant & Budd, 1982; Friedling & O'Leary, 1979; Glenwick & Barocus, 1979; Meichenbaum & Goodman, 1971;

Palkes, Stewart, & Kahana, 1968; Robin, Armel, & O'Leary, 1975).

A small but growing body of similar research has addressed the correspondence on mentally retarded individuals. Burgio, Whitman, and Johnson (1980) investigated self-instructional training with five mildly mentally retarded children; three of these children were considered distractible. Off-task behavior and academic performance (i.e., math and printing tasks) were measured across training and two separate generalization settings via a multiple-baseline design across subjects. The results indicated that there were both direct and generalized changes. These results included decreases in off-task behavior across settings and maintenance of behavior change for one subject during a 4-week follow-up period; similar data for the remaining subjects were unattainable. However, changes in academic task performance were observed. Burgio et al. (1980) suggested that similarly mentally retarded individuals are capable of learning to self-instruct and that such training may have generalized effects.

Johnston, Whitman, and Johnson (1980) also examined the effectiveness of self-instructional training in teaching math computation skills to three mentally retarded children. Utilizing a multiple-baseline design across subjects, these students were trained to self-instruct performance of addition and subtraction regrouping skills. Self-instruction resulted in increased accuracy, again suggesting that mentally retarded children can benefit from such training.

Although self-instruction has not been reportedly used among mentally retarded adults, there is some evidence to suggest its utility among this population -- particularly among those individuals who are competitively employed. Existing work behavior literature indicates that those strategies most often utilized by placement coordinators include strategies that do not incorporate the active participation of the employee (Schutz & Rusch, 1982). Rather, these strategies often include antecedents and consequences that are externally introduced and monitored. One problem associated with the external control approach is that, paradoxically, it may preclude development of self-directed behaviors (Kazdin, 1973; Zisfein & Rosen, 1973). Indeed, this deficit has been cited as a primary obstacle to the competitive employment process (Wehman, 1975). Typically, an employee is trained to acquire survival skills (Rusch, 1979a) under direct supervision and then expected to continue to perform the target skill(s) correctly without supervision. That the majority fail to maintain such skills is commonplace.

This limitation may be overcome by utilizing externally generated and monitored strategies in conjunction with self-generated or self-monitored strategies to develop the necessary self-control to achieve some measure of adaptive behavior. Clearly, if self-instructional procedures could be incorporated successfully by mentally retarded adults working in competitive employment settings, the benefits would be obvious. One result would be increased autonomy resulting in less time spent by vocational staff providing postplacement instruction. The primary purpose of the present study was systematically to replicate the Bornstein and Quevillon (1976) investigation among two mentally retarded employees. Each of these subjects' work supervisors indicated that the subjects were in danger of being fired because they failed to complete tasks originally included in their job descriptions. Their immediate supervisors and vocational follow-up staff had incorporated verbal instructions and praise in their attempts to teach these workers to perform all of their assigned tasks in the work environment but failed. Consequently, this investigation attempted to teach these two employees to incorporate self-instructional procedures to enhance the likelihood that they would complete job-related tasks in the performance of their duties and consequently remain employed.

Method

Donna and Beth voluntarily participated in this investigation. They were selected because their work supervisors expressed concern about specific tasks either "being continually neglected" or being "altogether not performed satisfactorily." At the time of this study Donna was 38 years old. Her IQ was reported to be 49 and, in conjunction with other measures, she was considered moderately mentally retarded. Generally, she was friendly, spoke clearly, and was socially competent. Before her competitive employment, Donna had attended a public school (first and second grades), a segregated school for trainable mentally retarded children (until 10 years of age), and a large state-supported residential institution in Illinois (until 18 years of age). Her prior work experience included one year of employment as a kitchen helper and 16 years of sheltered workshop experience.

Beth was 28 years old at the time of this study. Her records indicated she had an IQ score of 57 and on the basis of this score and other information, was considered mildly mentally retarded. Throughout her childhood, Beth had resided in a state-supported residential institution for mentally retarded individuals in Missouri. She was referred to the Developmental Services Center, a rehabilitation services program in Champaign County, Illinois, in 1974. She received frequent treatment for incontinence after her referral to the Center, during her employment in a sheltered workshop and her employment during this investigation. Beth's eyesight was very poor; with correction her visual acuity was 20/200 in her left eye and 20/100 in her right eye. Material adaptations were made at the job site, including covering chrome surfaces with paper to reduce glare and highlighting gross color contrasts. Her co-workers indicated she also was easily distracted by new faces and disruptions in her work routine, yet they considered her friendly, inquisitive, and potentially a competent food service employee.

Settings

Donna and Beth were employed as kitchen helpers in separate university dormitories at the University of Illinois at Urbana-Champaign. Both were completing their 6-month probationary period of employment and were being considered for nonprobationary status. Their primary responsibilities during lunch and dinner included setting up and maintaining the cafeteria-style serving counter where approximately 1,000 students were served. Donna and Beth were among several other kitchen helpers who worked on the serving line in an assembly-line manner. Specific responsibilites while working on the serving line included serving meals, wiping the counter, keeping a sufficient supply of plates available for the students, and restocking the bread supply, the butter, and the desserts.

Dependent Measures

Based upon supervisors' evaluations, the amount of "time spent working" was selected as the target dependent measure (Rusch, 1979b). Similar to Burgio et al. (1980), the social significance of the treatment was evaluated by comparing the work performance of the two target subjects to randomly selected nonprobationary co-workers throughout this investigation (seven times in Donna's work setting and five times in Beth's). These normative comparisons were obtained to estimate, objectively, whether Donna and Beth were working within the nonprobationary co-workers' "range of competence" (Kazdin & Matson, 1981). Working was defined as serving meals or physically engaging in work-related activities leading to the completion of three assigned tasks (e.g., wiping counters, checking supplies, restocking supplies).

Traditionally, self-instructional strategies have been utilized to decrease distractibility (Bornstein & Quevillon, 1976) or increase attending to task (cf. Burgio et al., 1980). Largely, the range of target behaviors, which has been the focus of self-instructional strategies, has been relatively limited. In this investigation, working included three target tasks representing a broader range of performance measures. This measure is presented in Figure 1 as percentage of working intervals. Not working included instances where either subjects or co-workers stared off into space, stopped to rest, stood idly, or appeared to be engaged in nonproductive work (e.g., wiping the counter two or three times in a row for no apparent reason).

Observation and Recording Procedures

Donna and Beth were observed for 20 minutes during lunch or dinner meal service periods. Alternately, the dependent measure (i.e., working) was collected across lunch and dinner periods. Specifically, if Donna was observed during lunch on one day, she was then observed during dinner on the next day. This procedure was followed so that the observers could acquire representative data across the noon and evening meals for both subjects, and could observe other mentally retarded employees who were also in need of employment-related follow-up services. At times, however, data were collected over two consecutive lunch or dinner periods, owing to changes in either subject's job duties or absences (i.e., sickness). Inspection of these data suggested that there were no differences between the measures taken during lunch or those taken during dinner.

Co-workers were also observed for 20 minutes during these same periods in precisely the same way and during days in which the target subject had a day off.

Observers. Three placement coordinators, who were responsible for providing employment follow-up to persons placed by the Illinois Competitive Employment Project (Rusch & Schutz, 1979; Schutz & Rusch, 1982), served as observers. Each was familiar with the subjects, the work sites, the co-workers, and the supervisors.

Observer training. Observer training procedures used in this study were modeled after those described by Johnson and Bolstad (1973). In a group training session observers read the definition of the target behavior, were shown an example of a data sheet, and were instructed in the observation and recording procedures. Each observer was required to observe and record the working behavior of two or three nonhandicapped employees for approximately two weeks before collecting data for this study, in order to develop reliable and consistent measurement of the dependent variable. Each coordinator was trained by the fourth author before he or she had observed subjects in this study. Each of the three observers had to obtain a 90% level of interobserver agreement for two consecutive 30-minute periods of observing kitchen helpers (other than those associated with this study) in a dormitory setting.

Observation procedures. A momentary, time-sampling observation procedure was used. At the end of each 10-second interval the observer looked at the subject (or the co-worker on occasions when normative comparisons were being collected) and recorded whether or not the subject was working during that interval. At the end of the next 10-second interval the observer looked at the subject and similarly noted whether or not she was working. This procedure continued until 20 minutes had elapsed, on each consecutive work day in which work performance was observed.

Interobserver agreement. The interval-by-interval agreement method was used to calculate interobserver agreement before and throughout this investigation (Repp, Dietz, Boles, Deitz, & Repp, 1976). Agreement measures were obtained on approximately 20% of the observations (nine times for Beth and nine times for Donna) during lunch and dinner periods throughout this study. Agreement measures ranged from 92 to 100, with a combined mean score of 95. Agreement was computed by dividing the number of 10-second intervals in which two of the placement coordinators agreed the subject was working (not working), by he number of intervals they agreed and disagreed the subject was working (not working). The resulting quotient was multiplied by 100. Agreement was measured by having all observers start their stop watches together and then walk away from each other until they were unable to view each other's recording, yet were able to view adequately the entire 20-minute observation period. These measures were obtained only once on the co-worker work samples, and agreement was 94%. After this lone measure was collected, the supervisory staff indicated they did not "feel that so many people should collect data on their staff." Consequently, it was decided not to obtain similar agreement measures on either subject's peers.

Experimental Design and Conditions

A multiple-baseline design across subjects/setting was used to assess the effectiveness of the self-instructional package. Similar to the procedure in Bornstein and Quevillon (1976), self-instruction was introduced to both subjects with pre- and post-treatment measurement of the dependent variable. The following section overviews pre- (Baseline) and post- (Generalization) treatment condition, and details the self-instructional package.

Pretreatment (baseline) and posttreatment (generalization).

During these two conditions, both subjects were not provided any feedback regarding their work performance. Pretreatment (baseline) measures were collected 11 and 12 times during lunch and dinner, respectively, for Donna; post-treatment (generalization) measures were collected 11 and 14 times during lunch and dinner. Beth's pretreatment (baseline) measures were collected 15 and 13 times during lunch and dinner, respectively; post-treatment (generalization) measures were collected 10 and 8 times during lunch and dinner. Because all kitchen helpers associated with the Illinois

Competitive Employment Project were observed several times each week by placement coordinators, their presence was in no way unique to this investigation in that the experimental setting remained the same as usual.

Self-instruction. The self-instructional package used in this investigation was adapted from that reported by Bornstein and Quevillon (1976) and Meichenbaum and Goodman (1971). The self-instructional package contained six steps that were repeated continuously during four separate 30-minute training sessions conducted on Day 23 for Donna, and on Day 33 for Beth. The 30-minute intervention sessions occurred just before and during the first 30 minutes of lunch and dinner service. Specifically, one 30-minute self-instructional session was presented before lunch and one 30-minute self-instructional training session was presented before dinner. A second session was introduced during the first 30-minute period at the start of the lunch and the dinner meal services, respectively. Each session was separated by a 10-minute break.

Before the self-instruction session, both Donna and Beth were given feedback regarding their work performance as rated by their work supervisors. Both were told they needed to improve on "time spent working" to remain employed. Specifically, they were informed of the need to improve their work performance on wiping counters, checking supplies, and restocking supplies; although they served meals, they rarely wiped the counter top and checked and restocked the supplies, relying upon others to complete these tasks. Donna and Beth expressed the desire to improve their work performance to safeguard their jobs. Subsequently, the second author explained that she would teach them how to be more productive. She then outlined briefly the dimensions of the self-instruction intervention to be followed. This component of the self-instruction package was considered necessary to substantiate the intervention. All prior training conducted by the placement coordinators included this component, that is, a rationale for treatment. This component was by no means unique, and previous data indicate that both subjects were not affected by feedback from supervisors, co-workers, or placement coordinators.

At the start of self-instruction, the second author modeled the performance of the three target kitchen-helper tasks which the supervisors had noted that Donna and Beth were not performing (i.e., wiping counters, checking supplies, restocking supplies), while describing verbally what she was doing (Step 1). The subjects then performed the same tasks while the second author instructed aloud (Step 2). Then, the subjects performed the tasks while talking aloud to themselves, paced by the experimenter's soft whispers (Step 3), after which each subject whispered softly while the experimenter mimicked her lip movements, but made no sounds (Step 4). In the next stage the subjects performed the tasks while making lip movements without making any sounds, and the experimenter monitored each of them to determine if they were performing the tasks correctly (Step 5), after which the subjects covertly self-instructed while performing the tasks (Step 6). Both subjects self-instructed independent of the experimenter before the end of the first 30-minute session.

In this investigation, as in Bornstein and Quevillon (1976), each subject was asked to verbalize four types of statements in the performance of the tasks that supervisors indicated were not being completed. The four statements took the form of (a) asking questions about which tasks needed to be completed (e.g., "What does the supervisor want me to do?"), (b) answering the questions in the form of cognitive rehearsal (e.g., "I am supposed to wipe the counter, then check the supplies, then restock the supplies."), (c) guiding their performance of the task by self-instruction (e.g., "OK, I need to wipe the counter,"), and (d) self-reinforcing (e.g., "I did that right, I am doing what I'm supposed to.").

Beth and Donna were told to follow the same order when asking questions, answering their questions, guiding their performance, and self-reinforcing. Specifically, they were told to wipe the counter first, then check the supplies, and finally replenish the supplies. Checking and replenishing supplies were also taught in a specific order. For example, Beth first checked the plates, then made a decision about whether or not to restock plates or check the bread supply. Then, she decided whether to replenish the bread supply or whether to check the butter, followed by a decision to replenish butter or check desserts, and finally a decision either to replenish desserts or to begin the sequence again. After each decision the subject was told to self-reinforce her decision.

Because the subjects were motivated to work, the experimenter did not introduce primary reinforcers, as did Bornstein and Quevillon (1976). Like the effect reported by Bornstein and Quevillon (1976), the subjects responded during the initial rehearsal session as if they were actually in the work setting and made references to their supervisor's wishes (e.g., "Mrs. Jones wants me to keep the counter clean, I need to wipe the counter."). Also, during the training sessions the experimenter self-reinforced for a job not well done and then said, "Wait a minute, I need to do this better, I need more plates before I can reinforce myself."

Finally, if, during the self-instruction session, the subject made an error in verbalizing any of the four types of statements (i.e., asking and answering questions, guiding their performance, self-reinforcing) during the performance of any one of the three target tasks (i.e., wiping, checking, replenishing), the experimenter immediately corrected the error. This error-correction procedure was the same as that utilized by Bornstein and Quevillon (1976), whereby the subject was returned to that part of the self-instructional sequence where the error had occurred. When the subject completed one of the three target tasks, she was given instructions to perform another task.

As noted above, Donna and Beth were required to perform each of three target tasks in a specific order during intervention. However, after intervention -- that is, during the post-treatment (generalization) condition -- no effort was made to require either subject to perform each of the three tasks in a particular order, because any one of the three tasks might have required the attention of an employee, based upon setting demands (e.g., plates may have been low, yet counters may not have been dirty; thus, plates would have been restocked, possibly several times, before the counters were cleaned). However, data were collected to determine if the subjects performed any of the three tasks during the 20-minute observation period in addition to serving meals. Donna was observed performing at least one of the three tasks on 15 of 18 occasions after intervention.

Unlike Bornstein and Quevillon (1976), in this study, no attempt was made to control for possible observer-expectancy effects. However, one of the three observers used was blind

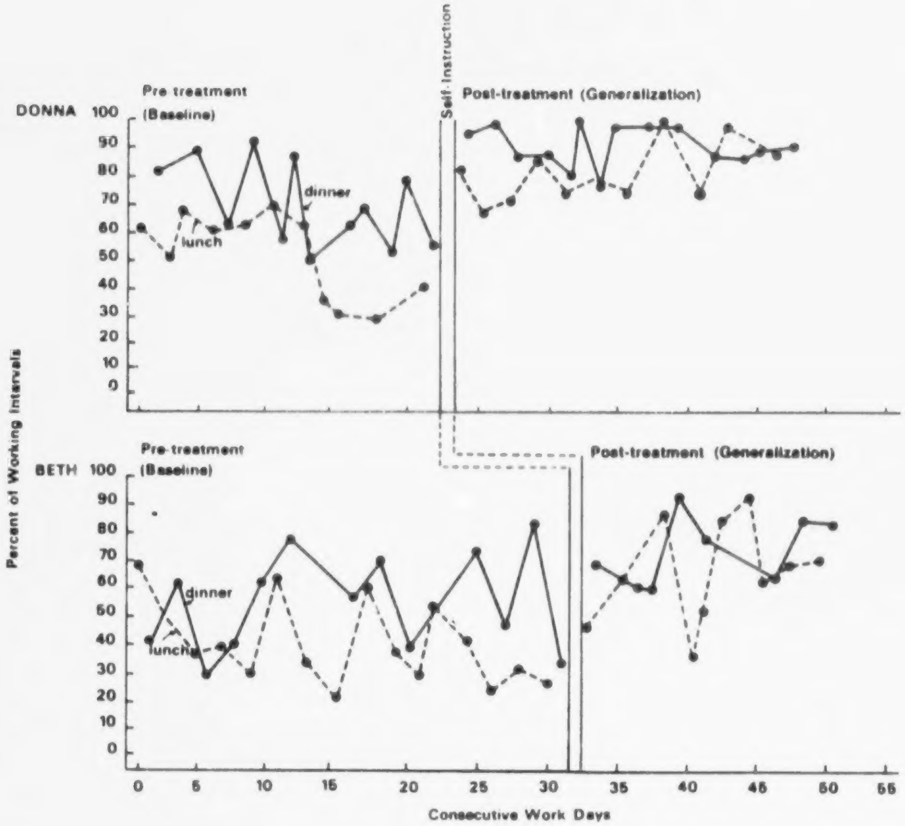

Figure 1. The percentage of intervals Donna and Beth were observed to be working across consecutive work days.

to the purpose of this study; thus he was not informed when the intervention was introduced. Inspection of this observer's data indicated his ratings did not differ from those of the other two observers. Because the subjects worked in two separate buildings, no attempt was made to control for nonspecific treatment effects.

Results

Figure 1 displays the results of the self-instruction training package. During pretreatment (baseline), Donna worked during 50% of the 10-second intervals observed during lunch and 69% of the intervals during dinner. After self-instruction, Donna increased her mean percentage of intervals worked during lunch to 79% and during dinner to 87%. Beth likewise increased her percentage of intervals worked during lunch to 66% from 40%, and during dinner to 71% from an average of 57%.

As measured by percentage of intervals worked, both subjects' work performance reflected increases over baseline observation measures. Also, the range (variability) of intervals worked decreased during post-treatment (generalization) assessment. Before self-instruction training, Donna's intervals worked ranged from 28% to 92% (across lunch and dinner); after self-instruction her intervals worked ranged between 66% to 97%. During lunch, 10 of her 11 lunch measures were below the standard set by her co-workers (co-workers' mean standard = 68%); after self-instruction training Donna was above the standard 10 out of 11 possible times. During dinner and before training, she was below the co-worker standard 8 out of 12 times (co-worker standard = 79%); after training she was above the standard 12 out of 14 times.

Beth's range of intervals worked was 20% to 82% during baseline. After self-instruction training her range decreased slightly to between 34 and 91%. Although this decrease in variability was not as dramatic as Donna's, Beth was observed after treatment to be exceeding her co-workers' performance on all but one occasion during lunch (co-workers' mean standard = 39%) and during dinner (co-workers' mean standard = 59%). In contrast, during pretreatment (baseline) Beth was observed to be working below these same standards on 21 different occasions (10 times for lunch and 11 times for dinner).

Beth's work performance during baseline and post-treatment were further analyzed via time-series analysis procedures introduced by Tryon (1982). For Beth, the time-series analysis showed a significant decelerating baseline trend ($Z = -5.42$, $p < .001$) during lunch and a nonsignificant decelerating baseline trend ($Z = -1.08$) during dinner. Because the lunch baseline showed a significant trend, a comparison time series was created and tested for trend, also utilizing the C statistic. The comparison series was obtained by subtracting the trend line values associated with the last 9 baseline points from the 9 treatment points. A significant difference was obtained ($Z = 4.17$, $p < .001$), indicating that the treatment phase departed from the trend set in baseline. Dinner post-treatment data were appended to the baseline data and tested for a trend. The resulting $Z = .871$, n.s., confirmed the visual impression of no difference in the trend for this time series.

Discussion

The results of this systematic replication of Bornstein and Quevillon's (1976) investigation indicate that a brief, yet intense, self-instruction package can significantly increase mentally retarded adults' work performance. The four 30-minute intervention sessions produced improvements in Donna's and Beth's work performance to levels that equalled, but more often surpassed, co-workers' performance. These findings have several implications for the employment education of mentally retarded individuals, who are typically thought unable to benefit from such cognitively oriented procedures. First, this study is the only effort in the work behavior literature to utilize self-instruction as a means to promote self-management of antecedent cues by mildly-to-moderately mentally retarded adults. This approach appears to focus attention in facilitating the self-selection of relevant cues. To date, all work behavior studies addressing similar survival skills among mentally retarded individuals have relied upon strategies that are introduced and monitored by a change agent (Connis, 1979; Connis & Rusch, 1980; Cuvo et al., 1978; Karlan, 1980; Karlan & Rusch, 1982; Matson & Martin, 1979; Rusch, 1979a; Rusch, Connis, & Sowers, 1978; Rusch & Menchetti, 1981; Schutz et al., 1980; Sowers, Rusch, Connis, & Cummings, 1980). In other words, these change agents "externally control" antecedent and/or consequent conditions to promote change in the target behaviors (cf. Gifford et al., 1984; Rusch & Schutz, 1981).

External control procedures do not require active cognitive involvement by the target subject in efforts to change his or her own behavior. In essence, these efforts require the use of change agents to effect changes in target behavior (Kazdin, 1980). In contrast, the self-instruction package used in this investigation enabled mentally retarded kitchen helpers to establish self-control over their own work performance. As a result, the intervention was time efficient and required far less placement coordinator involvement. This study complements Bandura's (1969) suggestion that the ultimate aim of external control procedures should be to establish internal control so that individuals can learn to control their own behavior with as little external influence as possible.

This study also indicated that externally introduced self-instruction procedures facilitate generalization across time, that is, maintenance. After the four 30-minute self-instruction sessions, Donna and Beth both generalized improved performance from the training setting to the actual work setting and then maintained their targeted work behavior for 4 and 6 weeks, respectively. Although other studies in the mental retardation work behavior literature have demonstrated generalization across time (cf. Gifford et al., 1984), this study is the first to suggest that mentally retarded individuals can generalize vocational skills across time given such a brief intervention. Future research is clearly obviated to examine similar self-instructional packages that may assist many other mentally retarded individuals who are making the transition from sheltered to nonsheltered, competitive employment.

Another unique contribution of this investigation is the use of social validation, normative comparison measures to assess intervention effectiveness (Kazdin & Matson, 1981; Rusch, 1983). All too often the work behavior literature has established an arbitrary criterion for success that may or may not correspond to actual on-the-job performance. This study measured co-worker performance and incorporated it as a measure for evaluative purposes. Only one other study in the work behavior literature has used normative comparison to assess intervention effectiveness (Rusch, Weithers, Menchetti, & Schutz, 1980). It is possible that the expanded use of the performance standards set by employers in competitive employment settings will provide an accurate means to assess work competence. In this investigation both subjects were performing below the standards set by their co-workers. After intervention, both employees had equalled or out-performed their peers on the job. One very interesting finding was that Beth exceeded her co-workers' standards during dinner on all occasions after she was taught to self-instruct; before the self-instructional program was introduced she did not exceed her co-workers' standard. The time-series analysis indicated that there were no differences between baseline data or dinner post-treatment data. This comparison suggests that employers' standards may change at different points across time, and consequently judgments of "goodness" or "badness" may similarly change. Time-series analysis procedures are not sensitive to these clinical data.

The self-instruction literature contains several examples in which the target behaviors of mentally retarded individuals have been successfully modified (cf. Johnston, Whitman, & Johnson, 1980). There is also an indication that this strategy may differentially affect various target behaviors. For example, Burgio et al. (1980) examined the effectiveness of a self-instruction package in increasing the attending behavior of two distractible, mildly mentally retarded children. Similar to this investigation, two "no-problem" students were observed in their regular classroom to validate treatment effects (normative comparison). During baseline, behavioral ratings were taken on both subjects during the performance of math, printing, or phonics tasks (phonics was measured only in the classroom). After baseline, self-instruction was implemented with the exception that the final step, in which the child whispers and then says the instruction to him- or herself, was deleted. After successful self-instruction verbalizations, subjects entered a distraction phase during which visual and audio distractors were introduced while the children worked on their tasks. Transfer was assessed on a complementary task (for example, if math problems were used during training, writing was used during transfer). Also, generalization to the classroom was assessed across math, writing, and phonics tasks. Their results indicated that the children learned to self-instruct and that their self-instruction ability generalized across tasks and, to a lesser degree, across setting (i.e., to the classroom). Self-instruction decreased the children's off-task behavior. However, their ability to print or complete the phonics task did not improve; a small increase in math skills was noted. Contrary to the Johnston, Whitman, and Johnson (1980) investigation, which showed improved academic performance, Burgio et al. (1980) primarily demonstrated changes in self-instruction abilities.

In the present investigation, the self-instruction intervention successfully modified two mentally retarded adults' percentage of intervals worked. This measure represents one of several survival skills Rusch and Schutz (1981) and others (e.g., Greenspan & Shoultz, 1981) have identified as crucial for employment survival. This measure is similar to those measures typically referred to as on-task behaviors in academic settings and is considered to be necessary for academic survival. In the academic remediation literature, research such as reported by Whitman and his colleagues (Burgio et al., 1980; Johnston et al., 1980) has attempted to assess setting and response generalization, albeit with mixed success. It is possible that self-instruction may differentially affect different responses within a single response class as well as different responses across classes. For instance, self-instruction may be expected to influence work performance because it successfully influences on-task behavior; however, as has been indicated in the academic remediation literature, it may not (Ferritor, Buckholdt, Hamblin, & Smith, 1972; Hay, Hay, & Nelson, 1977;

Kirby & Shields, 1972; Walker & Hops, 1976). Future research is needed to investigate the factors associated with self-instruction as it is utilized to enhance a myriad of work behaviors.

Several areas of potential research are indicated by these results. This investigation, and others before it, have not examined the components of the self-instructional package introduced by Meichenbaum and Goodman (1971) over a decade ago. There appear to be several components worth investigating, including: (a) the effects of teaching correct exemplars only, (b) the time allotted to actual instruction, and (c) the methods used to withdraw the four self-instructional statements to enhance stimulus generalization. At the present time there are noteworthy exceptions to the idea of teaching examples drawn from the stimulus class. For example, Hupp and Mervis (1981) examined whether severely handicapped students learned categories of manual signs if provided only one "best" example versus three "good" examples. Additionally, three "good" examples were compared to three examples that included one poor, one good, and one excellent example. The results of their study suggested that teaching "good" examples only was superior to the other two strategies. In the present investigation and in that of Bornstein and Quevillon (1976), considerable time and effort was expended when teaching subjects to detect an error and then to self-correct that error (e.g., "I am not checking the plates. I should be checking the plates now. I need to check the plates before I can reinforce myself."). Excluding this step would save considerable instruction time and would appear to change the level of cognitive rehearsal that is currently used in teaching self-instruction.

Regarding instructional time and generalization, which may be inextricably related, it is not clear what advantages would be gained if subjects were required to self-instruct for protracted time periods. Previous research has only addressed this issue from the perspective of whether these responses generalized versus whether, given response generalization, differing levels of stimulus generalization would be expected (Burgio et al., 1980). Future research that focuses upon generalization types affected by instructional time appears warranted.

Four different statements typically are included in the self-instructional package: one question, one answer, a guiding statement, and a self-reinforcing statement. At this time, there is no research on the relationship of each of these statements to the sum total of all of the statements. It is clearly possible that the guiding and the self-reinforcing statements may account for the greater majority of treatment effects (Karlan & Rusch, 1982).

Finally, the findings of this investigation support the findings reported by Bornstein and Quevillon (1976), but are discrepant from those reported by Friedling and O'Leary (1979), who offered two reasons for the discrepancy: the first reason related to teacher attention, whereas the second related to the age of the subjects. Regarding the first reason, Friedling and O'Leary (1979) monitored teacher attention throughout their study. Bornstein and Quevillon (1976) did not report whether or not they assessed or controlled for teacher attention. In the present investigation, no positive feedback was offered to either subject before, during, or after the conduct of this research, which is not uncommon in work situations (Rusch, 1983). Typically, employees are told what to do or not to do at the beginning of the work shift and little if any attention is subsequently paid to performance, unless the employee altogether neglects his or her duties. Regarding age, Friedling and O'Leary suggested that the 4-year olds used in the Bornstein and Quevillon (1976) study might have benefited more from complying in the school environment than the 7- and 8-year-old subjects utilized in their own study. In the present investigation, as indicated above, there were no co-worker, employer, or experimenter consequences for compliance.

In summary, this study showed that self-instruction can be effective in the remediation of deficient work behavior. The most impressive effect that this study demonstrated may be the alleviation of work behavior deficits from the perspective of incorporating mentally retarded subjects as active participants in the generation of salient and important mediative responses.

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Teaching a Student with Severe Handicaps to Self-Instruct: A Brief Report

Frank R. Rusch, Meredith McKee, Janis Chadsey-Rusch,
and Adelle Renzaglia

Failure to achieve a measure of independence in the work setting has been suggested as one reason why young adults with mental retardation fail to remain employed (cf. Wehman, 1975). Investigations of self-control procedures point to the potential of these techniques for being useful for enhancing independence that is critical if individuals with handicaps are to enter integrated work environments. Recently, Rusch, Martin, and White (1985) differentiated between teaching strategies that were introduced and monitored by change agents such as teachers or job coaches and those strategies that were introduced by the change agent with the goal of teaching the target individual (the person with a handicap) to use self-control strategies. Typically, these self-control strategies help the individual to perform one or more important functions, such as: (a) responding through

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recognition of a discriminative stimulus or verbal mediation, (b) monitoring performance, and (c) evaluating one's own performance through self-reinforcement or punishment.

To date, few self-control studies have included persons with severe mental retardation as change agents, particularly when the self-control procedures require that the individual assume responsibility for self-instructing, self-monitoring, and self-reinforcing. Two studies have been published that have sought a measure of self-control that incorporates a subject's verbal behavior to guide and direct target behavior. Neither of these studies, however, incorporated persons with severe mental retardation. Rusch, Morgan, Martin, Riva, and Agran (1985) examined the effects of self-instructional training on the amount of time two women with moderate mental retardation spent performing duties associated with serving meals in large dormitory dining settings. The self-instructional procedure was fashioned after those procedures reported by Meichenbaum and Goodman (1971), as well as others (Borstein & Quevillon, 1976; Friedling & O'Leary, 1979; Rosenbaum & Drabman, 1979). Typically, these self-instruction studies have taught target students to recognize situations (e.g., desk work associated with classroom academic instruction) whereby the student is to perform desired behavior (e.g., completing math problems) versus undesirable behavior (e.g., being out of one's seat).

Next, the student is taught to evaluate and then reinforce or punish his/her response. For example, the student may be taught to say, "I have been working very hard on my math problems, I have been very good." Finally, as in Rusch et al. (1985), the self-instructional procedure is usually taught during one brief, yet intense two-hour period after an initial baseline assessment period. The effects of the two-hour instruction are assessed during a post-training period (i.e., over the next several sessions or days). The results of this instruction included an increase of independent task change within the work environment and appropriate amounts of times spent on each task in the Rusch et al. (1985) study.

The second study, reported by Agran, Salzberg, & Stowitschek (in press), applied the same amount of instruction as reported by Rusch et al. (1985). The purpose of this study was to increase the number of requests for materials to complete assembly of two tasks in a sheltered workshop. Subjects were taught to make statements that would serve to direct their behavior in a room separate from the actual work setting. After the four, 30-minute instructional sessions, requests for materials were assessed in the sheltered work setting. Results showed that the five subjects increased the number of appropriate requests for materials within the work setting; furthermore, four of the subjects maintained this behavior over time.

The purpose of this investigation was to apply a self-instructional procedure that incorporated daily instruction rather than the single instructional format reported by Rusch et al. (1985) and Agran et al. (in press). Also, this study sought behavior changes in a nonsheltered setting with an adolescent with severe handicaps.

Method

Subject

The subject was a 16-year-old male who attended a self-contained classroom for students with severe handicaps within a regular attendance center. School records indicated that Mark's IQ was 33 as measured by the Stanford-Binet. In addition, Mark had cerebral palsy that affected both upper and lower extremities and used a wheelchair and crutches for mobility. In terms of academic skills, Mark demonstrated reliable counting to three and basic sight reading (approximately 30 words) and number recognition skills (numbers to 99). Mark's language was delayed and dominated by echolalic patterns.

Setting

All instructional sessions and data collection occurred in a community-based work experience site at a film center located on the University of Illinois campus. Mark received, filled, and delivered orders for miscellaneous desk supplies. Each work day Mark moved between the clerical areas and the warehouse where a supply closet was located. This particular work site guaranteed Mark contact with at least two nonhandicapped workers every day.

Mark worked primarily in the supply closet area (approximately 4 m x 3 m), which was part of a larger receiving room (60 m x 60 m). During Mark's regular work period, 8:50 - 9:50 a.m., Monday through Friday, the receiving room staff were present. A second student was also present in the receiving room, but worked in another area on a different task. All the supplies that Mark needed were within his reach while he was seated in his wheelchair. After the work period, Mark would take a break in the staff lounge. At this time he would often purchase a food item from a vending machine. Occasionally, nonhandicapped employees were present during his break.

Dependent Measures

This study assessed changes in the number of appropriate requests made (a) for materials when the needed items were not available (Materials Missing), and (b) for more materials when there were not enough items to complete the order (Not Enough Materials). Each day Mark received orders stating what items were needed to complete an order. The orders were written on forms listing all possible items (e.g., adding machine tape, address labels, correction tape). The number of items that were needed was written to the left of the item (e.g., a "3" placed next to "adding machine tape"). Words and numbers used for the orders were taught to Mark before the initiation of this study. If Mark was instructed by the order form to get two blue pens and there were no blue pens in the storage cabinet, Materials Missing was coded. If Mark was instructed to get two blue pens and there was only one blue pen in the storage cabinet, Not Enough Materials was coded.

Experimental Design and Conditions

A multiple-baseline design across behaviors with a sequential withdrawal component (Rusch & Kazdin, 1981) was used to assess intervention effectiveness. This study included three experimental phases: Baseline, Self-Instruction, and Sequential Withdrawal.

Baseline. During Baseline, five opportunities for each of the two conditions were presented each day. Baseline for Materials Missing lasted 8 days and 22 days for Not Enough Materials. As indicated, Mark was presented the response opportunities via order forms. In the Baseline condition, each order provided opportunities for each request type. Before the start of the work period, a teacher's aide told Mark, "If you need anything, let me know." The aide then stepped back and monitored Mark's work.

Self-control. Mark was taught to make five separate responses during the self-control phase. First, Mark was instructed to make a statement that indicated that material was missing or that there were not enough materials (Step 1. "Can't (complete order)"). Second, Mark was taught to tap a picture of the teacher's aide with his finger (Tap) and say the name of the aide pictured (the picture was taped to Mark's wheel chair). "Tell (the aide)" was the verbal statement associated with the tapping response/behavior (Step 2. Tap and Tell). Third, Mark was taught to approach the aide, establish eye contact, and say "Excuse Me" (Step 3). Fourth, he was taught to make the request for either some items (Materials Missing) or more items (Not Enough Materials) (Step 4. "I need more (name(s) of item(s))"). Finally, Mark was taught to reinforce himself with a nickel after completing each of the four previous steps (Step 5).

The Self-Instruction condition consisted of a two-step training procedure similar to that described by Wacker and Berg (in press). Step 1 occurred during a preinstruction training period in which Mark was taught to follow the five-step self-instructional sequence. This preinstruction occurred just before actual work performance. The preinstruction training procedure consisted of five components: (a) a rationale, (b) a model, (c) opportunity for practice, (d) feedback on performance during practice, and (e) reinforcement. The teacher's aide provided the rationale and modeled correct performance.

The rationale presented was "To do good work, Mark, you have to tell me when you need more items. Watch (the aide) and me. Listen to what I say." An observer and aide then modeled one situation of Materials Missing, using the five steps of the self-instruction package. Following the model, the aide gave Mark five orders to fill. Mark then proceeded to complete the orders using each of the five self-control steps.

During preinstruction, the aide provided corrective feedback. This feedback consisted of stopping the trial, going back to the last correct response, modeling the correct response, and then allowing Mark to perform the response independently. Immediately after each practice opportunity the aide praised correct performance (e.g., "That's right, Mark! You needed more pencils.")

After training on requesting materials (Materials Missing) in Step 1, Mark was provided performance opportunities to request more materials (Not Enough Materials). These performance opportunities were made available through new work orders similar to those used in practice. Feedback was not provided during these 10 opportunities (five opportunities for Materials Missing and five opportunities for Not Enough Materials).

Step 2 included the preinstruction component (Step 1 described above) and a performance component with feedback. During performance opportunities, corrective feedback was delivered immediately after errors in Mark's use of the self-control steps. Briefly, if Mark made a mistake, performance was stopped by the aide and Mark was returned to the last correct response. Then the aide modeled the correct response and Mark practiced the correct response. After each response, the aide provided corrective feedback, including praise, for the appropriate request.

Sequential withdrawal. Preinstruction and the pictures were withdrawn during this experimental condition. Withdrawal was initiated with Materials Missing at the same time that Self-Instruction was applied to Not Enough Materials. During the Withdraw Preinstruction phase, the number of preinstruction trials for Materials Missing was reduced to two trials. Two preinstruction trials were available for four days and then preinstruction trials were reduced to one opportunity trial for the remainder of this condition. Preinstruction trials for Not Enough Materials were reduced from five trials to two trials to one trial. Preinstruction trials were eliminated simultaneously for both behaviors at the end of the study.

The picture was also eliminated during the Sequential Withdrawal condition for both measures. For both measures the picture was first cut in half; this stimulus was present for five days. The entire picture was removed after another five days.

Observation and Recording Procedures

Observers. Two graduate students in special education at the University of Illinois served as observers. They coordinated their observations with two classroom aides throughout the study. The aides were college graduates and were in their first year of teaching.

Observer training. Before this study, each observer met with the second author to discuss the definitions of the dependent measures and the coding system. Agreement was established by the second author observing behavior independent of the observer. After each observation, the second author and observer discussed and resolved all disagreements.

Observer agreement. Percentage of agreement was determined by dividing the sum total number of agreements plus disagreements and multiplying the quotient by 100. Mean agreement across both measures behaviors during Baseline was 99% (range = 97-100, 3 sessions); during Self-Instruction agreement was 99.9% (8 sessions); and during withdrawal agreement was 98.5% (8 sessions).

Aide training. The classroom aides had been working in

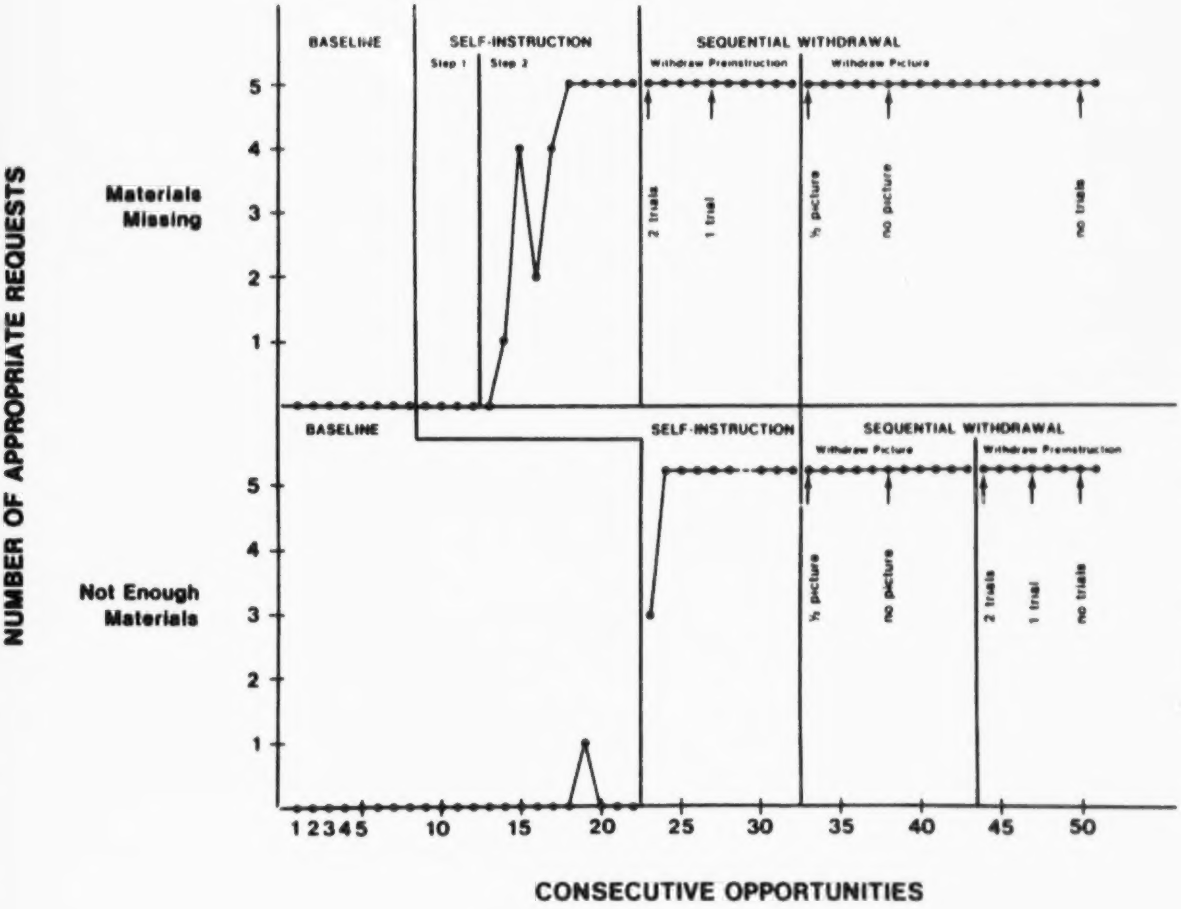

Figure 1. Number of appropriate requests used in performance during Baseline, Self-Instruction, and Sequential Withdrawal.

the training site before the start of this study. The aides met with the second author to discuss the purpose and procedures of the study. The aides were trained after this introduction but before their involvement. Training consisted of rehearsing expected behavior with feedback from the second author. Each aide was trained in at least three sessions and each session consisted of three to five opportunities for training. During the training sessions, the second author and an observer recorded the aide's performance. These observations were used to provide descriptive feedback to the aides about instructing Mark. The aides performed 93% of the instructions accurately during these sessions.

Results

Figure 1 displays Mark's requests for materials. During Baseline, Mark made no requests for materials (Materials Missing); he did make one request for more materials (Not Enough Materials, Session 19). Figure 1 also shows that Mark made no requests for materials during Self-Instruction, Step 1. However, Mark did request materials when feedback was provided during performance (Step 2). Mark also began requesting more materials when the preinstruction (Step 1) and feedback during performance (Step 2) components were combined (see Sessions 23 through 32, bottom panel, Figure 1).

During the Sequential Withdrawal condition, Mark continued to make the five separate responses during the performance phase. Specifically, when the number of training trials were reduced from five to two (Session 23 and Session 44) and then to one trial (Session 27 and 47), Mark continued to perform independent of any feedback. The systematic withdrawal of the picture did not result in a loss of acquired behavior either (refer to Sessions 33 through 51 for Materials Missing and to Sessions 33 through 43 for Not Enough Materials).

Figure 2 displays a more detailed analysis of Mark's use of each of the five self-control statements throughout this investigation. For example, Mark made the statement "Can't ______" for Materials Missing during the Baseline condition and during Step 1 of the Self-Instruction condition. On one occasion he said, "I need more (object) please." (Session 1). Mark also indicated that he could not complete his order, tapped his picture, and said to the aide, "Excuse me, I need more (object), please" (Refer to Session 19 for Not Enough Materials). When instructional feedback was combined with preinstruction (Step 2), Mark performed each of the five self-instructional responses when materials were missing (Materials Missing) and when there was Not Enough Materials. Only on a few occasions during the Sequential Withdrawal did Mark fail to make each of the five responses.

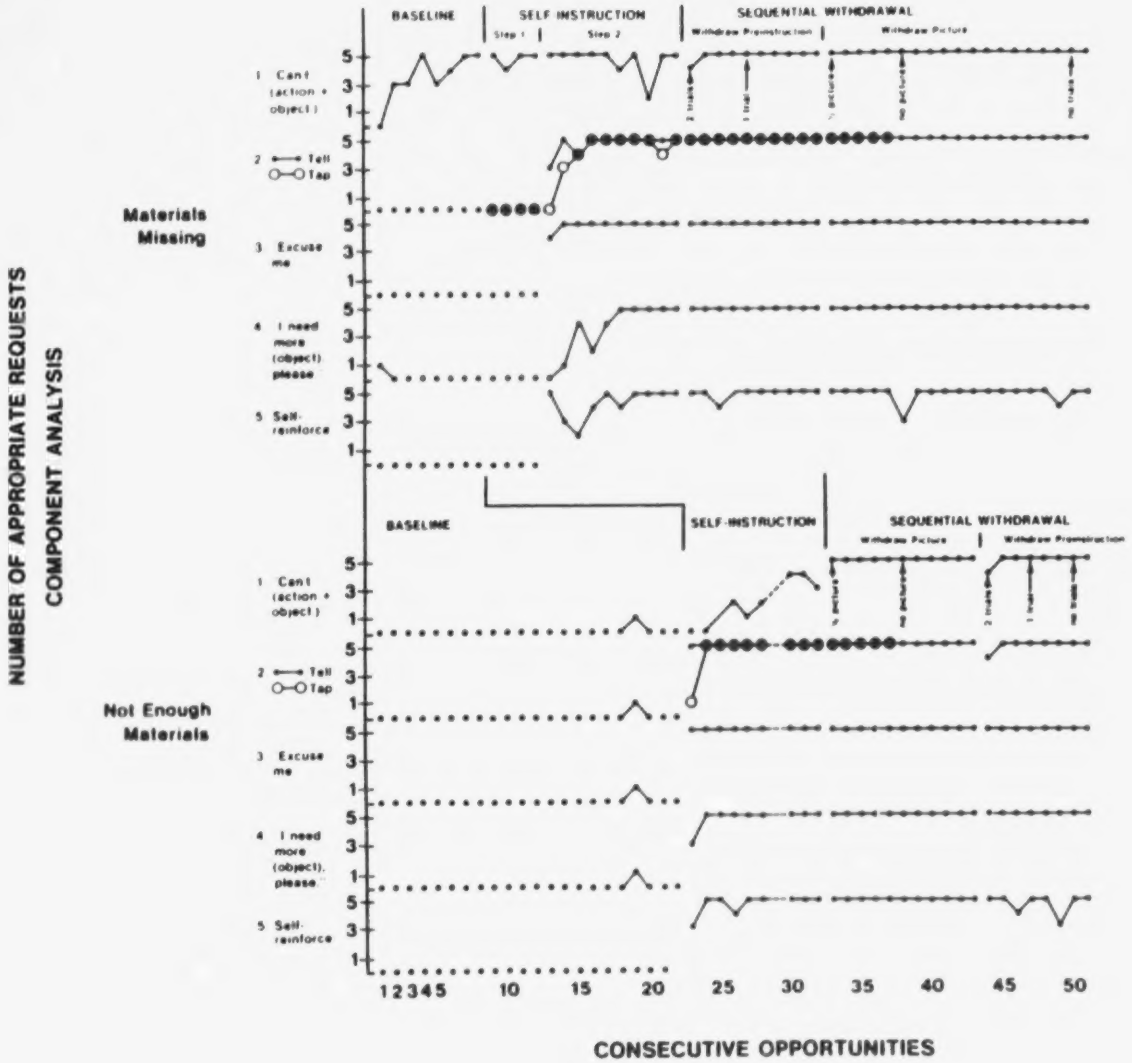

Figure 2. Component analysis of appropriate requests in performance during Baseline, Self-Instruction, and Sequential Withdrawal.

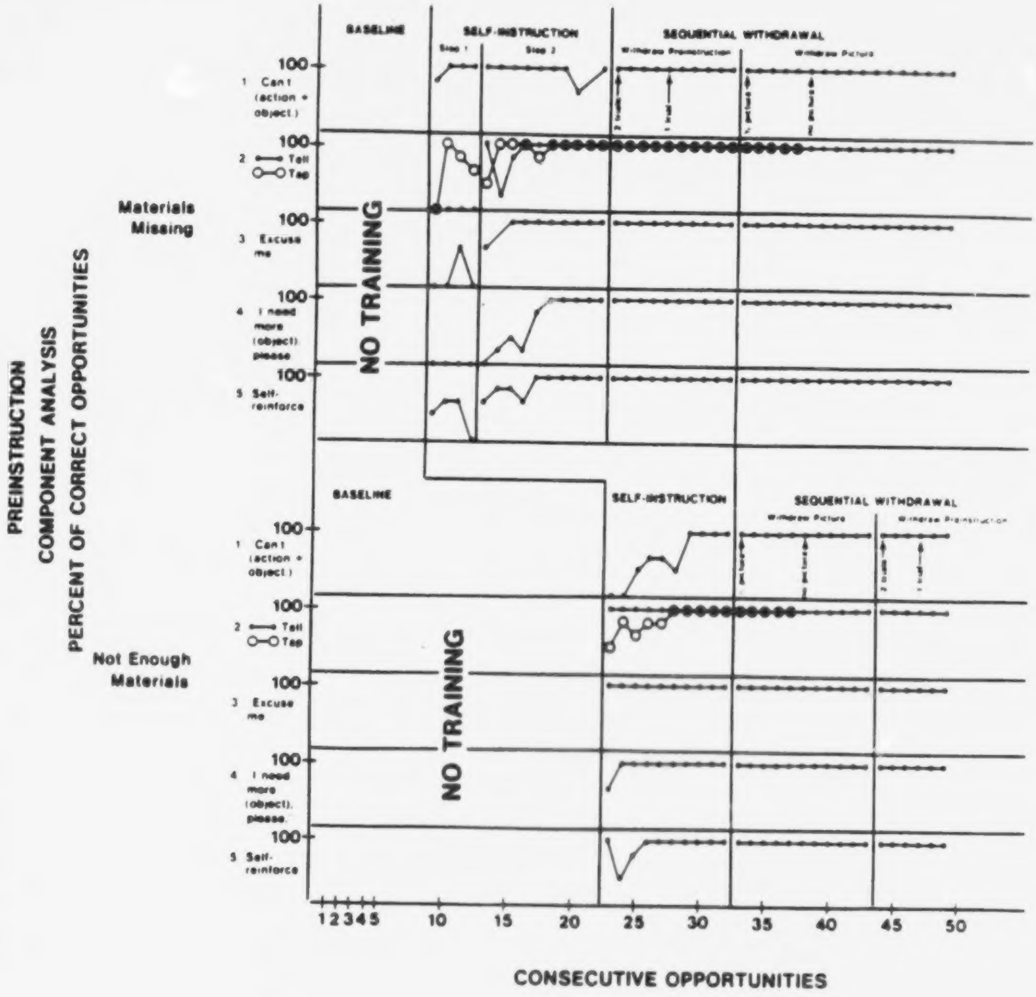

Figure 3. Component analysis of appropriate requests during preinstruction period across the Self-Instruction and Sequential withdrawal conditions.

Finally, Figure 3 shows Mark's acquisition of the five self-instructional responses during the preinstructional period. Interestingly, Mark did acquire some of the responses during Step 1 of the Self-Instruction condition; however, as noted above and in Figures 1 and 2, he did not perform these responses during the performance period until instructional feedback during performance was added (Step 2).

Discussion

This study represents a systematic replication of work reported by Rusch et al. (1985) and Agran et al. (in press). Rusch et al. (1985) applied self-instructional teaching strategies introduced by Meichenbaum and Goodman (1971) to two women with moderate mental retardation working in a restaurant setting. These women demonstrated increased independence in changing tasks after a brief, yet intense two hour self-instructional training period. Agran et al. (1986) applied self-instruction training to requests for materials in a sheltered workshop. Five workers with moderate mental retardation were trained to request materials through four, 30-minute sessions outside the work setting. The five subjects demonstrated increases in the number of appropriate requests after the training. This study applied a similar strategy to a student with severe handicaps in an effort to teach him to request materials within a community vocational training site. As in the Rusch et al. (1985) and Agran et al. (in press) studies, however, the subject in this investigation demonstrated rapid, positive changes in the number of appropriate requests for materials only when preinstruction was combined with instructional feedback during performance.

In addition to subject population and amount of training, the present study differs from both the Rusch et al. (1985) and Agran et al. (in press) studies. First, it is not clear what effect preinstruction had on the acquisition of self-instructional and requesting behavior. In the Rusch et al. (1985) and Agran et al. (in press) studies, pre-instruction was effective in producing target behavior. The time allowed for performance assessment of preinstruction alone (Step 1) may have been too short in the present investigation. Some evidence exists to indicate that the self-instructional behaviors may have been emerging (Figure 3). However, in the present investigation, failure to request during Step 1 and the time available to complete the analysis contributed to the decision to introduce corrective feedback in the performance setting. Assuming preinstruction was a significant component in acquisition of self-instruction, it still is not known which step or combination of steps most strongly influenced acquisition. Clearly, a component analysis is necessary to identify these combinations in addition to replication across more persons with severe handicaps.

A question posed by this study's investigation of response maintenance also warrants further attention. The withdrawal schedule utilized was systematic, yet conservative. This study did not allow for investigation of the component(s) of the treatment strategy that contributed most to response maintenance. Further study is needed to recommend guidelines for systematic withdrawal across similar individuals and the varying complexities of work settings.

The results of this study contribute to an emerging literature that is seeking to adapt traditional self-instructional teaching strategies to the special learning characteristics of students with severe handicaps. This study supports recent arguments to shift the responsibility of performance monitoring and reinforcement to the target student, rather than relying upon teachers or other change agents (Rusch et al., 1985). This study also showed maintenance of the target behaviors after preinstruction and instructional feedback were sequentially withdrawn. Rather than withdrawing the teaching strategies abruptly, an attempt was made to withdraw salient components of the teaching strategy systematically in an effort to maintain behavioral gains made by a student with severe handicaps. In summary, this study taught self-instructional statements to a student with severe handicaps to enable him to request (more) materials needed for him to complete his job.

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Utilizing Self-Management Procedures to Teach Independent Performance

Thomas R. Lagomarcino and Frank R. Rusch

Recent applications of self-management procedures have demonstrated the effectiveness of this strategy in changing behavior and in establishing maintenance and generalization across various stimulus dimensions. Studies have been instrumental in promoting the independence of persons who have relied on teachers and trainers to tell them what tasks to perform, how to perform them, and when (Gifford, Rusch, Martin, & White, 1984). However, there are few studies that report teaching self-management strategies to persons with severe handicaps (Browder & Shapiro, 1985).

Wehman, Schutz, Bates, Renzaglia, & Karan (1978) studied the ability of persons with severe handicaps to determine and administer their own reinforcers through a series of single case studies. Their first study compared the effects of noncontingent, externally administered, and self-administered reinforcement on the work performance of a person with

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profound mental retardation. This research used a latin square design to show that external reinforcement was the most effective strategy for increasing work production. During this condition, the supervisor sat adjacent to theworker and provided verbal praise and a penny immediately after the completion of a floor pulley. When 10 units were finished, the money earned was exchanged for an edible reinforcer. Self-administered reinforcement was found to be more effective than noncontingent reinforcement. During the self-administered reinforcement condition, the worker was instructed to take a penny from a container next to him for each of the ten units he completed. When he had completed 10 units he put the money back into the container and took an edible reinforcer.

In the second case study, Wehman et al. (1978) compared the effects of externally administered, self-administered, and self-determined reinforcement on the work performance of a person with severe mental retardation. During the external reinforcement condition, verbal praise was contingent upon the worker appropriately reinforcing himself with three pennies for each unit completed within a specified time. The self-administered reinforcement condition consisted of the worker paying himself three pennies for each unit completed within a specified time period without verbal praise. During the self-determined reinforcement condition, the worker determined his own schedule of reinforcement and the amount of reinforcement he was to receive. Results indicated that self-determined reinforcement produced the highest level of production.

The results of the second case study conducted by Wehman et al. (1978) indicated that persons with severe mental retardation may be capable of self-monitoring and delivering reinforcement for their own work performance. In addition, utilizing these procedures may result in performance that exceeds the performance obtained when reinforcers are selected and delivered by external change agents (e.g., teachers, parents, work supervisors). However, it is unclear which training procedures were used to teach the worker to self-administer and self-determine his reinforcement.

More recently, two studies have reported using self-control procedures (Bates, Renzaglia, & Clees, 1980; Morrow & Presswood, 1984). Bates et al. (1980) used a changing-criterion design in conjunction with self-monitoring and self-reinforcement procedures to increase the work productivity of a woman with profound mental retardation. During Phase One of the study, the woman was taught to self-administer her reinforcers. Before each work period, the worker was instructed to pay herself one penny for every two units she completed. At the end of the work period the staff member would acknowledge verbally whether or not the worker had earned her pennies, which could be exchanged for edible reinforcers. The second phase consisted of setting a production rate criterion for the worker for each work period. This phase was introduced because self-reinforcement alone had not been effective in increasing work production. Before each work period, a staff member would indicate to the worker the number of pennies she had to earn before break. A board with penny-sized holes was placed on the table in front of her to monitor how much work she had completed and how much work she had remaining. Adjustments were made in the criterion after the production rate had stabilized at each criterion level. The introduction of self-monitoring procedures (i.e., the penny board) in conjunction with the use of a changing-criterion design were successful in increasing work performance.

Morrow and Presswood (1984) demonstrated self-monitoring by an adolescent with multiple, severe disabilities. The subject was a 15-year-old male who was diagnosed as schizophrenic in addition to having a profound bilateral, sensorineural hearing loss, and scoring in the profound range of mental retardation. Self-monitoring was introduced in the classroom in a multiple-baseline design to eliminate stereotypic jaw and ear flapping, hand contortions, and inappropriate noises. To cue the student to self-monitor, an electrical apparatus with two light bulbs and a remote control switch was used. When a timer rang, the apparatus would light up a happy face if the student had not engaged in the target responses;, the student was to sign, "I did not flap my jaw" and score a plus on the card. Conversely, if he did engage in the stereotypic response, he signed, "I did flap my ear or jaw," and scored a minus. By the end of the study, the student signed the self-evaluative statement before the face lit and set his own timer. This procedure was effective in eliminating the ear and jaw flapping and hand contortions and reduced vocalizations. In addition, probes indicated that treatment effects generalized to four other school-related environments. This study extended the usefulness of self-control procedures to behaviors that often interfere with learning for persons with severe to profound mental retardation.

Although each of these studies contributes to our understanding of how to teach independence, the specific steps necessary to teach independence to persons with severe handicaps are still being developed. The purpose of this investigation was to utilize specific procedures reported by Bates et al. (1980) in an attempt to identify self-management procedures that teach independent performance. These procedures, which combine the work of Bates et al. with work reported by others, rely initially on external assistance, such as a teacher, parent, or co-worker who provides the instructions. The final emphasis is placed on performance without this assistance in using the newly acquired self-management procedures to complete the targeted task(s).

Method

Subject

The subject, Curt, was a 19-year-old male enrolled in a segregated classroom for students with severe handicaps within a regular junior high school. School records indicated that Curt's IQ was 16, as measured by the Stanford-Binet. He was placed in the public school program after spending most of his life in a small institution for children and young adults with severe and profound mental retardation.

Curt's receptive language skills were limited, as indicated by his ability to understand only simple gestures and one- and two-step verbal directions. In addition, his speech was limited to single word utterances. A communication book consisting of Bliss symbols and line drawings had been developed to aid Curt in expressing himself. However, Curt usually required direct prompting to use this form of communication correctly. Furthermore, Curt possessed several behaviors that interfered with his ability to initiate or complete a task. These behaviors included making loud screeching sounds, masturbating, rocking, spitting, and shaking his head back and forth.

Curt's prevocational training experience consisted of bussing tables in a small restaurant. This placement was discontinued after a three-month period due to the need for constant one-on-one supervision to complete the assigned tasks and the frequent display of inappropriate behaviors (e.g., loud vocalizations). At the time of this study, Curt was a member of an enclave working in a small janitorial supply company. He worked Monday through Friday mornings from 9:15 to 11:30. His primary responsibilities included preparing plastic bags to be filled with liquid soap and packaging these finished products.

Setting

Curt worked in a large room which was set up specifically to package liquid soap. Four employees with handicaps were responsible for performing all the tasks related to packaging the soap. Their work performance was monitored by an on-site supervisor and assisted by a teacher's aide.

Four work stations were set up to package the liquid soap: (a) tray filling, (b) soap filling, (c) heat sealing, and (d) packing. Curt worked primarily at the tray filling and packing work stations. The tray filling station required the workers to place empty plastic bags in sectioned wooden trays and transport the filled trays to the soap filling station. The packing station consisted of placing the filled bags of soap into a shipping box, taping the shipping box shut, and transporting the filled boxes to the storage area.

Dependent Measure

The number of steps completed independently was selected as the dependent measure. When he was provided with instructional support, Curt demonstrated the ability to fill trays and package filled bags (his assigned tasks) with 80-90% accuracy. However, the supervisor had indicated that Curt frequently required verbal cues or physical assistance to begin work, perform specific steps in the chain, stay on task, and continue working after completing one trial.

Independent Measures

Self-monitoring and self-reinforcement served as independent measures. Self-monitoring was defined as the procedure of systematically monitoring and recording one's work performance (Workman, 1982). In this particular study, self-monitoring occurred when Curt independently picked up a nickel after completing a work unit (i.e., filled tray, packaged box). Self-reinforcement was defined as self-administering and self-delivering the reinforcer (Wehman, 1975). Specifically, in this study, self-reinforcement occurred when Curt independently placed the nickel in the nickel board before beginning a new sequence of work steps.

Observation and Recording Procedures

All instructional sessions and data collection procedures occurred at the employment site. The tray filling and packaging tasks were broken down into smaller steps, which resulted in two separate task analyses. These task analyses were validated by the site supervisor and served as the steps that Curt had to follow to complete his assigned duties. In addition, data were collected on the two independent measures.

Observers. The observers consisted of job coaches who were responsible for providing instruction to students placed into integrated employment settings. All of the observers were familiar with the subject, the work site, the co-workers, and the supervisor.

Observer training. Observer training procedures used in this study were modelled after those described by Agran (1986). Specifically, in individual training sessions each observer read the definition of the target behavior, was shown an example of the data sheets to be used, and was instructed in the observation and recording procedures. Each observer was trained by the student investigator and had to obtain an 85% level of interobserver agreement before observing in this study.

Agreement checks were obtained by having a second observer simultaneously and independently observe and record Curt's responses in the performance setting (i.e., performing the task related steps at the identified work stations). Inter-observer agreement scores were calculated by dividing the number of agreements by the total number of agreements plus disagreements; this quotient was multiplied by 100. Interobserver agreement was taken on approximately 25% of the observations. Agreement measures ranged from 85% to 100%, with a combined mean score of 96%.

This study utilized traditional intrasubject experimental designs to evaluate each of the four phases. The first phase, Reinforcer Assessment, was evaluated by using a reversal design and a changing-criterion design; a multiple-baseline design was used to assess self-management acquisition (Phase 2). A combined multiple-baseline design and a modified changing-criterion design was used to evaluate Production (Phase 3). Finally, Maintenance was assessed by using a withdrawal design (Rusch & Kazdin, 1982) with a changing criterion.

Reinforcer Assessment

A reinforcer test was introduced before the formal collection of baseline data in this investigation. A sorting task, similar to the one reported by Rusch (1977), was selected to determine the effects of selected reinforcers on work performance. The task consisted of sorting large binder clips and large marking pens.

Baseline. Baseline condition consisted of the results of three 2-minute sessions. The job coach was seated beside Curt at a large table within the work area. One large box that contained a mixture of large binder clips and large blue marking pens was placed on the table. On each side of this larger box were two smaller boxes. The box on the right contained one marking pen. The box on the left contained one binder clip. The session began by having the job coach take a marking pen out of the larger box and place it in the smaller box with the pen, saying "Pens here." The coach then selected a clip out of the larger box and placed it in the smaller box with the clip and said, "Clips here." Next the job coach said, "This is what I want you to do. Put pens here and put clips here" as she pointed to the respective boxes. The coach would then set the timer for 2 minutes and say, "Go to work." Baseline continued for three 2-minute sessions.

Reinforce clips. During the Baseline condition described above, Curt never sorted binder clips. Thus, sorting binder clips was reinforced during this condition. Instructions were similar to those offered during Baseline with two exceptions. First, a glass jar was placed close to the smaller box containing the clips. Next, the job coach demonstrated how to place the pens and clips in the appropriate boxes. In addition, whenever she placed a clip in the smaller box she would put a nickel in the jar, rattle the jar, and say, "Sort clips, get nickel." After modeling, the coach would say, "What would you to like to work for, cake, soda pop, or music?" Curt would point to the reinforcer that he wanted before sorting began. The coach would conclude by saying, "Remember, sort clips, get nickels, get (selected reinforcer)." She then set the timer for 2 minutes and said, "Go to work." Each time Curt placed a clip in the box the job coach would say, "Good job, way to go, Curt" while placing a nickel in the jar and rattling it. No attention was given for sorting pens. If any clips were sorted during the 2-minute period, Curt would receive the reinforcer. If no clips were sorted, the job coach would say, "Let's try again." These procedures continued for 12 sessions.

Reinforce pens (reversal). The same procedures were followed in this condition as in the Reinforce Clips condition; however, reinforcement was received only for sorting pens. This condition was introduced to determine if the reinforcers would serve to redirect Curt's performance.

These procedures continued for 15 sessions.

Reinforce Pens (Changing Criterion). During this condition, the same procedures were followed as in the two previous conditions. However, during this condition, Curt was required to sort a predetermined number of pens during the 2-minute period in order to receive the reinforcer. The criterion was increased incrementally by one after Curt met the criterion for two consecutive sessions. The criterion was adjusted upward throughout this condition.

Experimental Design and Phases

Following the reinforcer test, a multiple-baseline design across behaviors was used to assess Curt's ability to self-manage. The conditions studied included baseline, self-management instruction, production, and maintenance.

Baseline. During this condition, all of the necessary supplies for completion of the tasks were set up at the respective work stations (i.e., filling trays and packaging filled bags). The job coach would set a timer for 10 minutes and give Curt the directive to "Go to work." The coach would then move to another part of the room and typically would assist the other workers in the performance of their work assignments. No assistance was given to Curt during this 10 minute time period. When the timer went off, the job coach would approach Curt and say, "You are done with this job.

Now I would like you to go do another job." Curt would then stop filling trays and move to the packaging area. The job coach would then repeat the same procedures at this work station.

Self-Management Instruction. The purpose of this condition was to teach Curt how to use two new instructional aids to self-monitor and self-reinforce his work behavior before actual production. These instructional sessions took place at the employment site using the same materials required for completing the two tasks. First, a small container containing several nickels was put next to the exact place where Curt completed the last step of each of the two tasks. For example, the container was placed at the soap-filling station for the filling trays task because the last step in this task was setting the filled tray down at the next work station. When Curt was packaging soap, the container was placed on a box in the storage area because the last step in this task was transporting the full box to the storage area.

The second aid consisted of a nickel board containing coin slots. The board, which was approximately 8 inches in length and 1 inch in width, was located in clear view at the work station where Curt was working. Once the board was positioned, the job coach would then model the use of the two instructional aids. Specifically, she would fill the tray with plastic bags, transport the tray to the soap-filling station, and while at this station, would remove a nickel from the container (first instructional aid) and say "I filled trays, I get nickel" (self-monitoring). She returned to the filling trays work station and placed the coin in an empty slot in the nickel board (self-reinforcement) (second aid). When the board was full of nickels she would run her index finger across the board while saying "It's full. I get reinforcer."

After preinstruction, the job coach instructed Curt to select what he would like to work for (cake, soda pop, or music). After Curt had selected the reinforcer, the coach instructed Curt to place the reinforcer by the designated work station, close to where the nickel board was located. The coach would then say "Fill trays, get nickels, get (selected reinforcer)". Finally, the coach would set the timer for 10 minutes and say, "Go to work." The coach would remove herself from the work station and would only return to provide a verbal reminder if Curt failed to pick up the nickel or did not place the coin in the nickel board. If Curt completed the work within the 10-minute period, the coach would provide verbal praise ("Good job"). If time expired before he had completed all the steps, the coach would say sternly, "No nickels, no (selected reinforcer)!" These training procedures were conducted across both tasks until Curt independently self-monitored and self-reinforced on two occasions.

Production. After Curt had learned how to self-monitor and self-reinforce, the job coach implemented these procedures in the work setting. First, the job coach provided Curt with one opportunity to practice all the steps in the task, self-monitor his work behavior, and self-reinforce. The job coach used a 5-second time delay to deliver verbal cues to Curt to help ensure task completion and provide an opportunity for Curt to practice the self-reinforcing and self-monitoring steps.

After the practice trial, the job coach would instruct Curt to select a reinforcer (i.e., soda pop, cake, or music) and place it at the appropriate work station. Next, the job coach would set the timer for 10 minutes and give Curt the directive, "Go to work." The job coach would then move to another part of the room and typically would assist other workers. However, she would return to Curt's work area to instruct Curt to pick up the nickel at the end of the sequence. Specifically, a verbal cue was given to Curt as he was performing the step before picking up the nickel, in an attempt to shift the stimulus for self-monitoring to the step immediately preceding picking up the nickel. This additonal step was added during this phase because Curt failed to pick up the nickel during self-management instruction. Once the board was filled with nickels, the job coach would return to Curt's work station and make sure that Curt exchanged his reinforcers correctly. This consisted of Curt running his finger along the board while saying "Full" and then exchanging the filled nickel board for the previously selected reinforcer.

A modified changing-criterion design was implemented in multiple-baseline fashion to evaluate Curt's self-monitoring and self-reinforcing. Typically, when a criterion is established the target individual is allowed a period of time, such as 10 or 15 minutes, to meet the criterion across all sessions. In this study, Curt was given 10 minutes to meet the criterion in the usual manner, however, if Curt met the criterion in less than 10 minutes, he was immediately reinforced. Subsequently, he met the criterion in less than 10 minutes on several occasions; but on several other occasions he failed to meet the criterion in the time allotted (refer to Figure 2). This modification was used to provide Curt with the opportunity to exchange his full nickel board immediately after meeting the criterion.

The criterion for the filling trays task was based on Curt's performance before the investigation of self-management procedures began. Specifically, during a period of time preceding this investigation Curt was reinforced by the job coach for his performance of the two tasks. This reinforcement consisted of verbal praise similar to that provided all other target employees and trainees participating in the enclave. The initial level was determined by selecting the highest number of steps that Curt had independently completed during a 10-minute session when instructional assistance and reinforcement were provided by a coach who was at a distance of approximately one meter. However, Curt was not consistently meeting the criterion during the 10-minute period under this condition. Consequently, the criterion was re-adjusted based upon Baseline data collected during Phase 3 of the investigation. Once Curt met the adjusted criterion for two consecutive sessions, the criterion was adjusted upward one step at a time. These procedures continued until Curt met the production level established by the work supervisor.

Maintenance. During this condition, the job coach no longer provided Curt with an opportunity to practice the self-monitoring and self-reinforcing procedures immediately preceding his actual work production. Curt was simply given the instruction to "Go to work" and the job coach provided a verbal reminder if Curt failed to pick up his nickel. The rest of the procedures remained the same during this condition.

Results

Figure 1 displays the number of items sorted per 2-minute session during Reinforcer Assessment (Phase 1). During Baseline, Curt did not sort any clips while sorting 0, 2, and 1 pen(s) across the three sessions. Introduction of the Reinforce Clips condition resulted in an increase in the number of clips sorted and correspondingly a decrease in the number of pens sorted. The Reinforce Pens condition was then introduced to assess further the effects of the selected reinforcers on work performance. The Reinforce Pens condition resulted in a decrease in the number of clips sorted across the 15 sessions. However, even though Curt received reinforcement for sorting pens and not for sorting clips, there were only two sessions when Curt sorted more pens than clips during this condition (Sessions 28 and 30).

Finally, a Reinforce Pens condition utilizing a changing-criterion design was introduced to determine whether or not Curt's work performance would adjust to an increase in the amount of work he was required to do before receiving his reinforcement. The dotted lines denote the changes made in the criterion during this condition. The results of this condition indicate a consistent increase in the number of pens sorted, which corresponds to the changing criterion. On occasion, Curt failed to meet the criterion after a change had been made. For example, when the criterion was changed

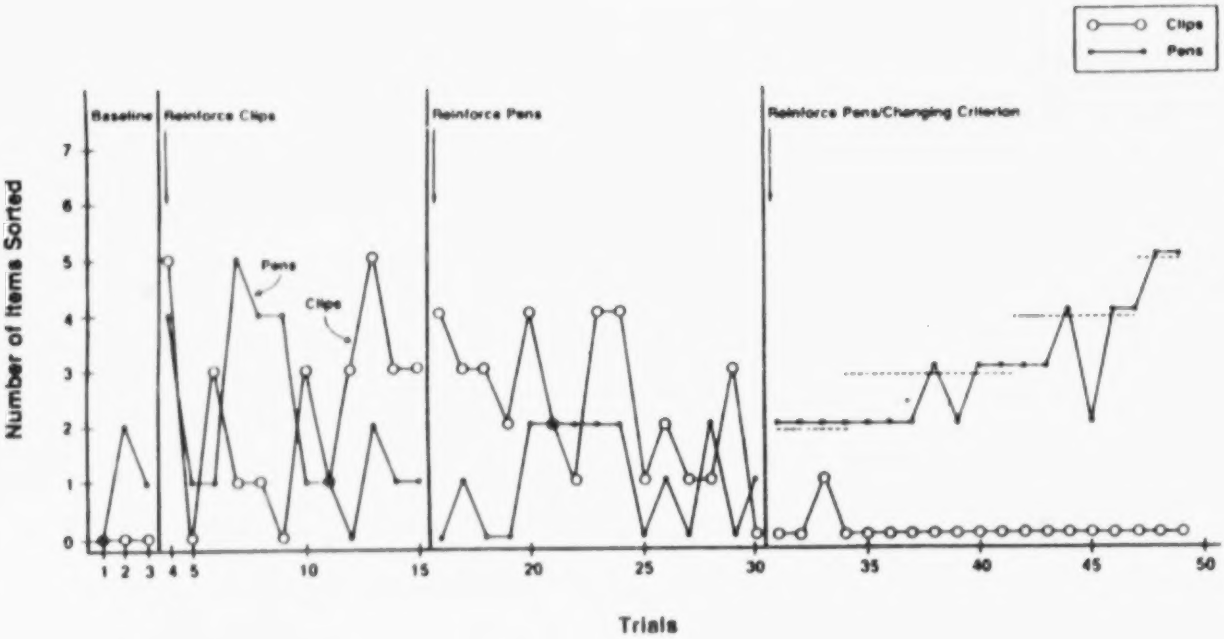

Figure 1. Number of items sorted in pen and clip study.

from sorting two pens to sorting three pens before receiving reinforcement, Curt failed to meet the criterion on the first three opportunities before finally earning the reinforcement. Similarly, Curt failed to meet the criterion on the first two opportunities after the criterion had been changed to sorting four pens before receiving reinforcement. Once Curt had met the criterion for the first time in each of these examples, he failed to meet the established criterion on only two occasions (Sessions 37 and 43). Interestingly, Curt only sorted one clip during the 17 sessions of this condition.

Figure 2 shows the number of steps completed independently across Filling Trays and Packaging Soap tasks. Curt's work performance in both tasks fluctuated a great deal during Baseline. The range for Filling Trays was 0 to 28 steps completed independently (x = 12.9). The range for Packaging Soap was 0 to 59 steps completed independently (x = 30.8). The introduction of self-monitoring and self-reinforcement procedures in combination with a changing-criterion resulted in an increase in performance across both tasks. Specifically, the criterion for filling trays appeared to be set too high initially as indicated by the inconsistency with which Curt was able to meet the first criterion to receive his reinforcement. In fact, Curt met the first criterion only seven times in the first 33 sessions.

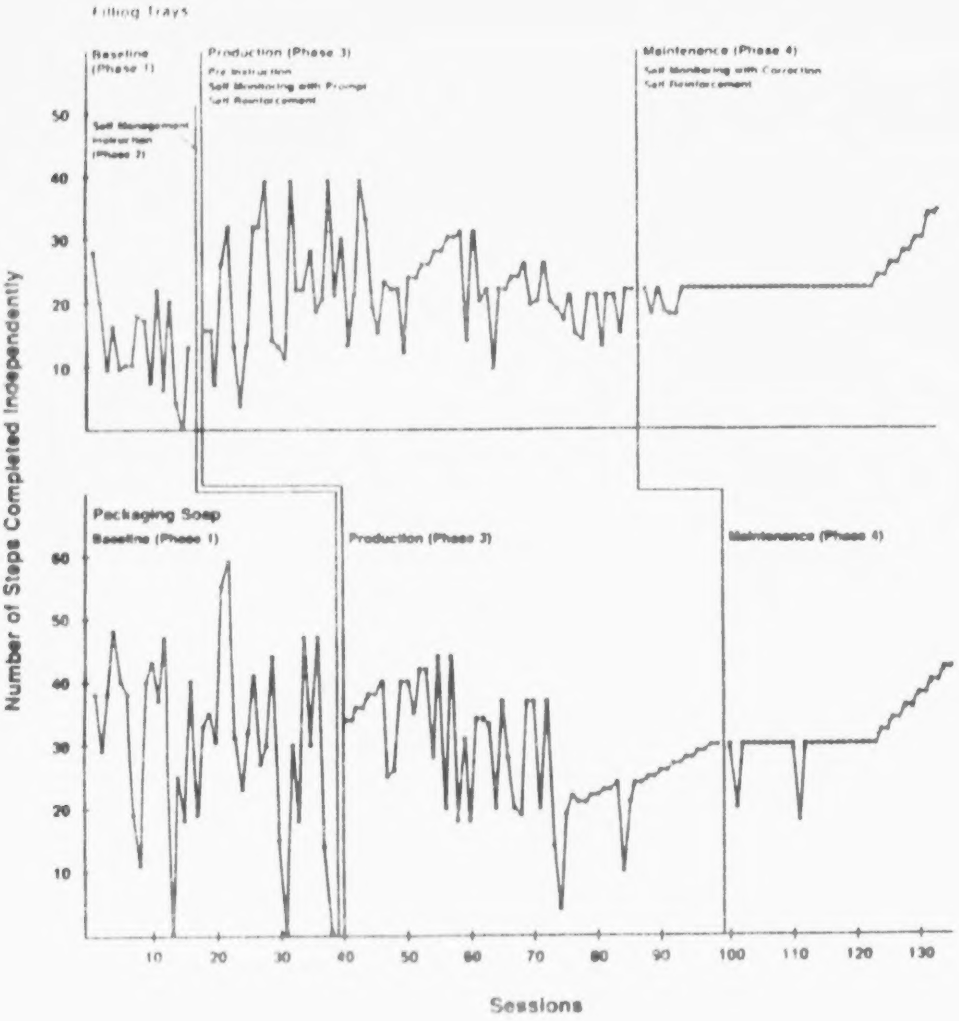

Figure 2. Number of steps completed independently in Filling Trays and Packaging Soap study.

Consequently, the criterion for packaging soap was changed to reflect the median level of performance during Baseline. Curt met this lowered criterion as well as the criterions during four subsequent upward adjustments. Interestingly, Curt did not meet the criterion during his performance of both tasks as the number of steps increased to a certain level. Each time that he failed to meet the criterion for three consecutive sessions, the criterion was adjusted downward. Of similar interest is the finding that Curt met the newly established criterion on every occasion throughout the performance phase. Specifically, Curt met the initial criterion on three separate occasions during performance of both tasks. (See sessions 48, 65, 76, for Filling Trays and 40, 61, 77, for Packaging Soap).

Finally, during the Maintenance phase data were collected on the accuracy with which Curt self-monitored and self-reinforced his work behavior. These results indicated that Curt self-monitored with 83% accuracy and self-reinforced with 100% accuracy. In addition, data were collected on the number of steps performed independently. These data indicated that Curt continued to meet the established criterion. In fact, the supervisor requested that additional adjustments be made in the criterion. Curt continued to meet the criterion as these adjustments were made during the Maintenance phase.

Discussion

Earlier work by Wehman et al. (1978) demonstrated that self-administered reinforcement was effective in increasing the production rate of a person with mild mental retardation and a person with severe mental retardation. However, Wehman et al. failed to replicate these procedures with a person with profound mental retardation. Gifford, Rusch, Martin, & White (1984) point out that because some minimal level of cognitive ability is required to select reinforcers and to self-administer reinforcement, the subject's cognitive deficit in the Wehman et al. study may explain his failure to replicate. However, Bates et al. (1980) contradicted these earlier results by demonstrating that the production rate of a person with profound mental retardation could increase when combining a changing-criterion design with self-monitoring and self-reinforcing procedures. In addition, the results reported by Bates et al. (1980) suggest that the criterion may have been set too high in the Wehman et al. study. Consequently, the target individual may not have identified the discriminitive stimulus.

The present investigation utilized procedures similar to those outlined by Bates et al., (1980) to demonstrate that a student with profound mental retardation could learn to self-monitor and self-reinforce his own work behavior. These procedures were effective in reducing the amount of external supervision that was required to keep the employee on task as indicated by a site supervisor. Furthermore, when combined with a changing criterion these procedures were effective in improving the work performance of the employee across two work tasks.

This particular study extends the existing literature in several ways. First, the results of this study support the findings by Bates et al. (1980) and in so doing further demonstrate the feasibility of teaching persons with severe handicaps to self-manage their behavior. In addition, this study further defines the specific steps necessary to teach these skills to this population, which is essential given the paucity of studies to date that have attempted to teach self-management procedures to persons with severe and profound mental retardation. The four-step process that was outlined in this investigation provides a potential framework for teaching self-management procedures. First, the reinforcer assessment procedure provides practitioners with a systematic approach to collecting information on how persons with severe handicaps respond to selected reinforcers. The results of this assessment in turn are helpful in assessing the impact of the reinforcer before its inclusion in a training program. Second, this investigation outlined procedures that could be used to teach a person with severe handicaps to self-monitor and self-reinforce his or her own behavior separate from teaching that person to apply the procedures under production supervision. This step is helpful in determining wheter or not the individual is capable of learning self-management skills.

Third, the production phase introduces these self-management procedures to the targeted tasks and setting and, in addition, utilizes a clear changing criterion for reinforcement to structure the performance of the individual. Fourth, the maintenance phase provides an opportunity to evaluate the accuracy with which the selected individuals utilize newly acquired self-management skill(s) in the absence of direct supervision. In addition, it provides information about the degree to which the student continues to meet the established criterion.

Experimental control using the changing performance criterion design was demonstrated through multiple replications across the two tasks in this investigation. When Curt's target behavior failed to track the criteria closely, control was regained by changing the criterion, a procedure suggested by Hartmann and Hall (1976). The modification included setting a minimal level of performance which Curt had to meet within a designated time period before he was reinforced. If Curt met the criterion within the time period, however, the session was stopped and Curt was allowed to reinforce himself. This procedure was used so that Curt was able to receive the selected reinforcer immediately upon completing the last step in the production sequence (i.e., inserting the criterion nickel).

In addition, data were collected on the independent measures during the maintenance condition (i.e., self-monitoring and self-reinforcing). These data provide us with a better understanding of how well persons with severe handicaps utilize these self-management skills in the absence of direct supervision. These data indicated that Curt became more accurate in using these procedures as the study continued.

Furthermore, anecdotal information was collected which proved to be quite interesting especially in describing the process by which Curt managed his own behavior. In fact, even though Curt's expressive language skills were quite limited, he would frequently use a strategy resembling self-instruction in combination with self-monitoring and self-reinforcing procedures to keep himself on task. For example, Curt often could be observed engaging in one of his off task behaviors (e.g., rocking, playing with materials) and then proceed through a sequence of "self-instructions" that usually occurred in the following sequence: (a) Curt would point to the nickel board; (b) say "nickel"; (c) touch the reinforcer; and (d) verbally label the reinforcer (e.g., "music"). After going through this sequence, Chris would independently initiate the next step in the task without receiving any assistance from the supervisor. Maintenance data taken three months later indicated that Curt was continuing to use this strategy to stay on task.

Anecdotal information was also collected to help describe how Curt responded to changes made in the criterion. For example, frequently after the criterion was increased (he was required to earn additional nickels before receiving reinforcement), Curt could be observed taking more than one nickel from the plastic container and placing them in the nickel board. These data indicate that Curt understood the self-management procedures. This action was interpreted as an attempt by Curt to earn his reinforcer sooner. Again, the accuracy of the self-management procedures improved as Curt adjusted to each new criterion.

The results of this study are confounded somewhat by the introduction of psychotropic medication (Haldol) midway through the intervention phase (the 66th session). Staff at Curt's residential facility had prescribed the medication because of increased aggression and bolting behavior at that setting. Anecdotal information indicated that Curt's motoric responses were much slower during this time. Adjustments were made in the criterion in an attempt to allow for these physical changes. Once medication was significantly reduced during the maintenance phase, upward adjustments were made in the changing performance criterion. (Figure 2)

A second limitation of the study is the inconsistency with which Curt self-monitored his work behavior in the target setting after supposedly learning the skill during self-management instruction. This finding raises the question of whether it would be most beneficial to teach the self-monitoring and self-reinforcing procedures as part of the skill that has been targeted and in the setting that it is most often used. However, the purpose of the self-management instruction was to determine if Curt could acquire the skills before introducing these procedures into the work environment.

A third limitation of the study was the length of time it took before fading the prompt to have Curt pick up the nickel. However, this limitation was the result of Curt's failure to perform at certain criterion levels. One of the most interesting findings of this investigation relates to Curt's failure to perform after he showed consistent and improved performance when the criterion was changed. These data seem to suggest that Curt was either only capable of performing at a certain level or that he was unwilling to perform beyond a certain level given the reinforcers available. Additional research is needed to examine the design factors that are necessary for successful implementation of the changing criterion design. Also, the extended period of time in which the verbal cue was given during this phase could have an adverse effect on the accuracy with which Curt self-monitored his behavior during the maintenance phase. In other words, the job coach could have become the stimulus to self-monitor because she was required to approach the work area to provide the verbal cue. In fact, during the maintenance phase, Curt was frequently observed looking around for the job coach when it was time to pick up the nickel. An alternative to this approach would be to utilize time delay procedures to facilitate the transfer of stimulus control to the step preceding the self-monitoring step.

Shapiro, Browder, and D'Huyvetters (1984) reported that two of the students in their investigation failed to self-monitor accurately (28% and 44%). They suggested that this failure to discriminate the stimulus to self-monitor could have been due to incomplete fading of teacher prompts. Similarly, the student in this particular investigation did not self-monitor with 100% accuracy (83%), however, this percentage was significantly higher than those of the two students in the Shapiro et al. (1984) study. More research is needed to study the withdrawal of the external assistance that is initially provided in teaching the self-manangement skill to persons with severe handicaps.

This study attempted to teach self-management to a person with severe handicaps. In so doing, the procedures outlined in this study attempt to provide a strategy to teach these skills to individuals not traditionally included in self-management research. Obviously this population brings new questions and issues to this area of research. For example, the results of a recent study conducted by Shapiro, Browder, and D'Huyvetters (1984) suggested that both the learning of accurate self-monitoring and the effects on response maintenance and generalization were quite idiosyncratic. The authors went on to suggest that two of their subjects (i.e., persons with severe emotional disturbance with autistic tendencies and severe brain damage) could have failed for a variety of factors that may have interfered with skill acquisition. These potentially confounding factors included aberrant behaviors, variability of behavior, and ineffective prompting/fading procedures. Persons who exhibit tantrums, social withdrawal, and self-stimulatory behavior may require new methods of instruction in self-management. Additional research is needed to explore both the individual and environmental variables that may mitigate the effects of self-management with this population (Shapiro et al., 1984). Finally, these research efforts need to be extended across daily living skills and the natural settings where these skills are used.

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Utilizing Self-Management to Teach Independence on the Job

Thomas R. Lagomarcino, Carolyn Hughes, and Frank R. Rusch

The complexity of supported employment settings demands that persons with severe disabilities perform tasks that require a wide range of vocational and social skills. To date, intervention strategies that have been utilized that provide ongoing support to these individuals based upon direct instructional methods that foster employee dependence (Mithaug, Martin, Agran, & Rusch, 1988). Rather than enhancing the maintenance of appropriate job-related skills, these traditional methods rely upon an external change agent, typically a job coach, to increase the likelihood that work behaviors will be performed on the job within standards that are set by the employer.

Rusch (1986) has argued that follow-up procedures used to manage work behavior typically contribute to excessive dependence on job coaches and limited behavioral maintenance. Indeed, Rusch, Menchetti, Crouch, Riva, Morgan,

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and Agran (1984) showed that the behavior of target employees was different when a job coach was present from when the job coach was absent. Most recently, Martin, Mithaug, Agran, and Husch (in press) argued that unless job coaches implement specific training strategies that promote independent performance, they should not expect target employees to perform independently in their absence.

Self-Management Training in the Work Place

Self-management can promote independent performance in the absence of the job coach by allowing individuals to serve as their own change agents. When job coaches teach target employees to self-manage, the target employees themselves generate the necessary responses to prompt and maintain their own desired behavior (Mank & Horner, 1988). Four self-management procedures have proven to be particularly effective in promoting independent performance in employment settings (Agran & Martin, 1987). These include picture prompts, self-instruction, self-monitoring, and self-reinforcement. Briefly, picture prompts are prearranged visual cues that an individual uses to prompt the occurrence of a desired behavior; self-instruction allows individuals to use their own verbal behavior to guide their subsequent behavior; self-monitoring focuses upon individuals observing their own behavior and then systematically reporting or recording their performance; and self-reinforcement, which typically is used in combination with self-monitoring, provides an opportunity for individuals to reinforce their own behavior contingent upon performance of a target behavior.

To date, five published studies have demonstrated that self-management can be effective in promoting the independent performance in the work place by persons with severe disabilities. Implementation of self-management procedures has resulted in independent production by target employees (Crouch, Rusch, & Karlan, 1984; Lagomarcino & Rusch, 1988; Wilson, Schepis, & Mason-Main, 1987); independent task changes (Rusch, Martin, Lagomarcino, & White, 1987) and independent attention to task (Rusch, Morgan, Martin, Riva, & Agran, 1985); and improvement in social behavior (Wheeler, Bates, Marshall, & Miller, 1988). Table 1 provides a summary of the subjects, settings, dependent variables, and independent variables in these studies. Although each of these studies contributes to our understanding of how to promote independence in the work place, the specific procedures or combinations of procedures that are effective in implementing self-management are not well understood.

Table 2 presents a summary of the specific steps that have been used in the five published studies which have been effective in implementing self-management to promote independence in the work place (Crouch et al., 1984; Rusch, Morgan et al., 1985; Rusch et al., 1987; Wilson et al., 1987; Wheeler et al., 1988). As illustrated in Table 2, different combinations of seven specific steps have been used in varying ways in the five studies. These individual steps are: (a) identify the problem through evaluation; (b) verify the problem through observation; (c) establish a range of acceptable behavior; (d) assess the work environment for naturally occurring stimuli and reinforcers; (e) select self-management procedures; (f) train self-management skills by withdrawing external assistance; and (g) evaluate the effects of self-management. The total number of steps used in each study ranged from four (Wilson et al., 1987) to seven (Crouch et al., 1984).

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The individual steps used in these studies suggest a model that job coaches can use to teach self-management to target employees in order to promote independent performance on the job. The individual steps of the model describe target behaviors for the target employee and job coach to perform and criteria for evaluating their performance. A brief description of the individual steps follows.

Table 1

Summary of Self-Management Studies Conducted in Community Employment Settings

Study	Number of Subjects	Subject Description	Setting	Dependent Variables	Independent Variables
Crouch et al. (1984)	3	Moderate mental retardation #1 IQ 54 #2 IQ 47 #3 IQ 44	Food service settings in 3 separate university dormitories	Task duration	Reinforced verbal statements
Rusch et al. (1987)	1	Mild mental retardation IQ 55 Down Syndrome	Fast food restaurant	Independent task change	Tasks said independently
Rusch et al. (1985)	2	Mild to moderate mental retardation #1 IQ 57 #2 IQ 49	Food service setting in university dormitory	Time spent working (% of work intervals)	Self-instruction statements
Wilson et al. (1987)	1	Severe mental retardation IQ 34	Family-owned restaurant	Percentage of steps performed independently	Picture prompts
Wheeler et al. (1988)	1	Moderate mental retardation IQ 38 Down Syndrome	University vivarium	Social skills	Self-monitoring social skills training

Table 2

Summary of Steps used in Five Self-Management Studies

		Crouch, Rusch, & Karlan (1984)	Rusch, Morgan Martin, Riva, & Agran (1985)	Wilson, Schepis & Mason-Main (1987)	Rusch, Martin Lagomarcino, & White (1987)	Wheeler, Bates Marshall & Miller (1988)
1. Identify the problem through evaluation		x	x		x	x
2. Verify the problem through observation		x	x			x
3. Establish a range of acceptable behavior		x	x	x	x	
4. Assess the work environment for naturally occurring stimuli and reinforcers		x				
5. Select self-management procedures:						
a) Consider specific job requirements	x	x	x	x	x	
b) Consider the acceptability of the procedure within the work place	x					
6. Train self-management skills by withdrawing external assistance:						
a) Task analyze target behavior and self-management procedures		x	x	x	x	x
b) Train sequential steps through external assistance		x	x	x	x	x
c) Withdraw external assistance		x	x	x	x	x
7. Evaluate the effects of self-management:						
a) Assess the maintenance of target behavior		x	x	x	x	x
b) Assess the maintenance of self-management procedures		x			x	
c) Validate change in target behavior		x	x	x		x

Step 1. Identify the Problem through Evaluation

The first step of the model is to identify problem behaviors of target employees. Typically, the employer or work shift supervisor evaluates a target employee's work performance through routine work performance evaluations. These evaluations focus upon specific work and work-related skills required by a particular job and can be developed for any occupational area or work behavior (White, 1986). For example, the work performance evaluation form shown in Table 3 was used to evaluate persons with mental retardation who had been placed in supported employment settings (White, 1986; White & Rusch, 1983). Ratings obtained from these routinely administered work performance evaluations served to identify the current level of work performance of target employees, including areas that may represent a problem to the evaluator. For example, through monthly performance evaluations completed by the work supervisor, Crouch et al. (1984) identified productivity as the problem behavior of three individuals with moderate mental retardation who were employed in a university dormitory kitchen. Supervisor ratings indicated that although these individuals knew how to perform their assigned tasks (i.e., sweeping, mopping, setting up the lunch line), they did not start or complete these tasks at prespecified times. Therefore, "working faster" (productivity) was a problem identified through

Table 3

Work Performance Evaluation Form

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1. Poor - Shows no effort to meet requirements. Would not pass probation.

2. Needs Improvement - Makes effort to meet requirements but needs additional training to pass probation.

3. Average - Meets most requirements normally associated with job description and requires average amount of supervision.

4. Good - Meets all requirements and works independently with few exceptions.

5. Exceptional - Model employee, exceeds requirements in most areas, takes pride in job.

	Poor				Exceptional
A. Performance					
1. Works independently..	1	2	3	4	5
2. Completes all assigned tasks................................	1	2	3	4	5
3. Attends to job tasks consistently...........................	1	2	3	4	5
4. Meets company standards for quality of work.................	1	2	3	4	5
5. Meets company standards for rate of work performance........	1	2	3	4	5
6. Follows company procedures..................................	1	2	3	4	5
7. Maintains good attendance and punctuality...................	1	2	3	4	5
8. Takes care of equipment and materials.......................	1	2	3	4	5
9. Maintains acceptable appearance.............................	1	2	3	4	5
B. Adaptability					
1. Obtains/returns materials for tasks.........................	1	2	3	4	5
2. Adjusts rate of performance according to job demands........	1	2	3	4	5
3. Works safely	1	2	3	4	5
4. Follows a schedule..	1	2	3	4	5
5. Manages time appropriately..................................	1	2	3	4	5
6. Able to adjust to changes in routine........................	1	2	3	4	5
7. Solves work-related problems independently..................	1	2	3	4	5
C. Interactions with supervisors and co-workers					
1. Follows directions..	1	2	3	4	5
2. Accepts criticism...	1	2	3	4	5
3. Asks for assistance when necessary..........................	1	2	3	4	5
4. Gets along with fellow workers..............................	1	2	3	4	5

Comments:

____

____

____

________________________ Supervisor

__________________ Date

evaluation by the supervisor.

Step 2. Verify the Problem through Observation

Performance identified as problematic through work performance evaluations should be verified by the job coach (Rusch, 1986). White and Rusch (1983) found that employers and work shift supervisors tend to rate target employee performance more stringently than do co-workers or the target employees themselves. Rusch (1986) suggested that evaluations made by the employer or work supervisor should be the focus of verification by the job coach because they ultimately make final staffing decisions.

Performance may be verified by directly observing the work performance of the target employee and of a co-worker who is performing similar tasks. The job coach should compare the work performance of the target employee to that of the nondisabled co-worker. The purpose of this step is not to train target employees to work exactly like their co-workers, but to define the boundaries of acceptable work performance (Rusch, Chadsey-Rusch, & Lagomarcino, 1986).

Next, the job coach should schedule meetings with the employer or work supervisor to discuss the relationship between the work performance evaluations and the observations of the employees' work performance. As Rusch and Mithaug (1980) pointed out, agreed-upon competencies identified by both the employer or work supervisor and the job coach should be discussed first, followed by the discussion of those problem behaviors that have been identified through evaluation and verified through observation. Because evaluation by the employer or work supervisor is the target for consensus, actual intervention is necessary only when the employer or supervisor has identified a problem (Rusch, 1986). For example, Rusch, Morgan et al. (1985) verified the existence of an employer-identified problem by observing nonprobationary co-workers who were performing similar food service tasks. In contrast to these co-workers' performances, two employees with mild to moderate mental retardation were observed to spend considerably less time on task. Corroboration of evaluation and observation resulted in implementing self-management to improve target employee work performance.

Step 3. Establishing a Range of Acceptable Behavior

The next step is to establish a range of acceptable behavior. The job coach should follow three steps when determining this range (Rusch, 1986): First, obtain input from the employer or work supervisor; second, determine a range of work performance that is feasible; and third, negotiate with the employer or work supervisor about an acceptable range of performance. For example, Crouch et al. (1984) asked supervisors in a food service setting to determine the specific times at which tasks were to be started and completed. Then, nondisabled co-workers were observed in order to assess whether the supervisor-established criteria were being met by nondisabled co-workers. Interestingly, the co-workers were found to meet the supervisor-established critera for mopping and sweeping only once, although they consistently surpassed the criteria established for setting up the lunch line. The criteria that are set by employers and work shift supervisors are *not* met by all employees on all occasions. Therefore, accepting a target employee's work performance may be a function of how much the evaluator actually is aware of the target employee's performance, as well as of the performance of others in the work setting.

Step 4. Assessing the Work Environment for Naturally Occurring Stimuli and Reinforcers

This step requires the job coach to assess the work environment for the availability of naturally occurring stimuli and reinforcers to prompt and maintain desired work behavior that will ultimately result in reinforcement. If the assessment demonstrates that no event in the employment setting is serving as a stimulus for the performance of the target behavior, a stimulus must be established to prompt the behavior. For example, Crouch et al. (1984) trained co-workers in a food service setting to prompt employees with disabilities to use wristwatches to facilitate initiation and completion of job tasks at appropriate times. Others present in the setting also reminded the employees to look at their watches, using cues in the form of "Don't forget to get your job done on time; use your watch." The target employees were reinforced for starting and completing the jobs on time.

A discriminative stimulus is established when a behavior is reinforced in the presence of a particular stimulus in the environment (Terrace, 1966). Possible stimuli in the environment include clocks or whistles to prompt going to a job station and beginning work, co-workers leaving a job station to prompt going on break, or food scraps on tables to cue the employee to wipe table surfaces. Table 4 provides examples of discriminative stimuli that can be established in the workplace. Subjective evaluation methods should be used to determine what stimuli in the environment currently are maintaining the appropriate performance of nondisabled workers, as well as the acceptability of potential stimuli that may be established (White, 1986).

Additionally, the job coach should assess available reinforcers in the employment setting to maintain desired behavior (e.g., food items from vending machines, verbal praise from supervisor, social interactions with co-workers, performing selected job tasks, break-time, helping others on

Table 4

Discriminative Stimuli in the Workplace

	Stimulus	Response	Consequence
1.	Clock	Go to job station	Begin work
2.	Co-workers leave job station	Go to break	Take break
3.	Food scraps on table	Wipe table	Table is clean
4.	Out of job materials	Get job materials	Continue working
5.	Equipment breakdown	Seek maintenance personnel	Equipment is repaired
6.	Window is sprayed with cleaner	Wipe off cleaner with squeegie or towel	Window is clean
7.	Office is occupied	Move on to next unoccupied office	Followed supervisor instructions
8.	Usual transportation to work is unavailable (co-worker is sick)	Check bus schedule	Take bus to work
9.	Customer comes to counter	Greet customer	Customer returns greeting
10.	Dirty dishes are piling up	Increase rate of dishwashing	Dishes are cleaned in time

job tasks, use of a Walkman or radio). For example, Lagomarcino and Rusch (1988) observed the effectiveness of selected reinforcers in improving the work performance of an employee responsible for packaging liquid soap at a janitorial supply company. Reinforcers found to be effective when initially presented with social reinforcement were soda pop and snacks available from a vending machine and the use of a Walkman. The job coach may need to introduce socially acceptable reinforcers if none is currently available at the work site. Alternatively, naturally occurring events in the environment may need initially to be paired with social reinforcers if these events are to become effective at maintaining desired behavior (Lagomarcino & Rusch, 1988).

Step 5. Selecting Self-Management Procedures

Several self-management procedures can be used to promote independence on the job (i.e., picture prompts, self-instruction, self-monitoring, self- reinforcement). In choosing an appropriate self-managment procedure, the job coach must consider both specific job requirements and whether or not the procedure is acceptable within the work place.

The job coach should choose a self-management procedure that matches specific job demands. For example, Wilson et al. (1987) determined that an individual with severe mental retardation employed in a small restaurant could follow multiple-step instructions and that he was required to perform his assigned job tasks at stationary locations. Picture prompts served to prompt individual steps of each task (e.g., packaging silverware, hot sauce, and sour cream, and washing dishes).

Additionally, the job coach should choose a self-management procedure that is acceptable in the workplace. Menchetti, Rusch, and Lamson (1981) found that food service employers would allow only certain training procedures on the job. For example, Schutz, Rusch, and Lamson (1979) introduced two procedures that were found to be socially acceptable in a food service setting (i.e., a warning and a one-day suspension). These procedures were effective in decreasing the verbal abuse of three kitchen laborers with moderate mental retardartion toward trainers, co-workers, and supervisors.

Step 6. Training Self-Management Skills by Withdrawing External Assistance

Actual training of the self-management procedures by the job coach should include three steps. First, the job coach must identify the specific steps of both the target behavior and the self-management procedure. For example, Rusch, Morgan, et al. (1985) identified the steps necessary to complete three work tasks (i.e., wiping counters, checking supplies, and restocking supplies). Subsequently, a six-step self-instructional sequence adapted from Bornstein and Quevillon (1976) was introduced to prompt completion of the targeted tasks. The six steps included: (a) trainer models verbal and motor responses, (b) employee performs task while trainer instructs aloud, (c) employee performs task while self-instructing aloud, (d) employee performs task while whispering, (e) employee performs task while making lip movements without sound, and (f) employee performs task while self-instructing covertly.

Next, the job coach must teach the sequential steps of the self-management procedure by using techniques based on established learning principles such as shaping, prompting, fading, imitation, modeling, feedback, and rehearsal (Rusch, Martin, & White, 1985). For example, Wheeler et al., (1988) used modeling, verbal cues, and instructional feedback to teach an individual with moderate mental retardation who was employed as an animal caretaker to self-monitor his social behaviors.

Ultimately, the external assistance provided by the job coach must be withdrawn to allow target employees to prompt and maintain their own behavior across varying settings and tasks (Rusch et al., 1985). For example, Wilson et al. (1987) faded the job coach from the actual work area of a restaurant (i.e., from the kitchen to the dining area) when an individual with severe mental retardation was employed. Prompts and feedback were provided to the employee by the restaurant owners and the employee's co-workers. Rusch, Morgan et al. (1985) used prompting, modeling, and feedback to teach two food service workers to self-instruct in order to increase their amount of time spent working. Both employees maintained increased work performance after all external assistance was withdrawn.

Step 7. Evaluating the Effects of Self-Management

The final step requires the job coach to evaluate the impact of the self-management procedure on the target behavior after training has been withdrawn. Probes should be taken to determine continued performance of the target behavior. Additionally, data should be collected on the occurrence of individual steps of the self-management procedure (Browder & Shapiro, 1985). For example, Rusch et al. (1987) measured the target behavior (i.e., percentage of tasks completed independently and in sequence) and the performance of the verbal mediation technique used (i.e., percentage of tasks said independently).

Finally, validation of the impact of the intervention must be sought through work performance evaluations completed by the employer or work shift supervisor and by comparison of the work performance of the target employee to that of co-workers.

Comparison evaluation. Wheeler et al. (1988) requested the assistance of nonhandicapped co-workers in evaluating the improvement of specific social skills of a target employee. Evaluations were completed five times in an eight-month period. Results indicated that the individual's social skills were improved to within an acceptable range.

Comparison with co-workers. Crouch et al. (1984) found that the work performance of three employees with moderate mental retardation was comparable to that of their nondisabled co-workers. Crouch et al. (1984) also found that work supervisors believed that the productivity of three kitchen workers was no longer a problem after training. Interestingly, although the speed of one of the workers reached a supervisor-established criterion only once after training, supervisors stated speed was no longer a problem for this employee.

Conclusion

Research and training efforts have demonstrated the learning potential of persons with severe disabilities. These efforts have been accomplished primarily through a training technology that includes the following steps: (a) identify the problem through evaluation; (b) verify the problem through observation; (c) establish a range of acceptable behavior; (d) assess the work environment for naturally occurring stimuli and reinforcers; (e) select self-management procedures; (f) train self-management skills by withdrawing external assistance; and (g) evaluate the effects of self-management. Unfortunately, individuals with severe disabilities often continue to rely upon the trainer for initiation of correction cues.

The issue of concern is to ensure that persons with severe disabilities are able to perform the work behaviors that result in employer acceptance. Recent self-management research has involved target employees in the management of their own behavior, which enables job coaches to reduce, over time, the amount of assistance they must provide.

Supported employment is gaining recognition as an exciting alternative to the sheltered vocational delivery system available to most adults with severe disabilities. As a result, integrated employment opportunities are being established throughout the country (Bellamy, Rhodes, Mank, & Albin, 1988). The demands and expectations of these work settings exceed by far those that have existed in the sheltered work environments where most of these individuals have been expected to work. The job coaches who are responsible for the placement of persons with severe disabilities must become more aware of their role in promoting the independence of these individuals in these settings. The procedures proposed in this paper provide a model for actively involving the target employee, the employer, work supervisors, and co-workers in the promotion of independent work performance. Because of the limited number of published studies in the area, additional empirical investigation is needed to demonstrate the effectiveness of the proposed model. It is only through efforts such as these that we will be able to promote the independence of persons with severe disabilities in supported employment settings.

Notes

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